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ABSTRACT

Volume 1 reports on Federal productivity and productivity trends for Fiscal Years 1967-1973, and comments on the causes of productivity increases and decreases. The report, prepared to promote improved financial management in individual agencies and on a government-wide scale, includes productivity measurement data supplied by 46 agencies. The report indicates considerable progress has been made in the measurement of productivity but that many opportunities exist for further productivity improvements. Factors which can be used to motivate increased productivity are discussed. Overall Productivity Trends summarizes coverage of the FY 1973 sample; the trends of input, output, and productivity for FY 1967-73; and the analysis of causal factors which influenced the direction of productivity trends. Chapters 3-19 describe productivity trends in the following areas: agriculture and natural resources; citizens' records; training and education; medical services; loans and grants; postal service; power; reference services; regulation; specialized manufacturing; transportation; maintenance of facilities; overhaul and repair of equipment; procurement and supply; standard printing; general support; and government-Owned, contractor-operated activities. The Relation of Productivity Measures to Other Performance Measures, Cooperation with State and Local Governments, and Conclusions are the concluding chapters. Study related materials are appended. (NH)

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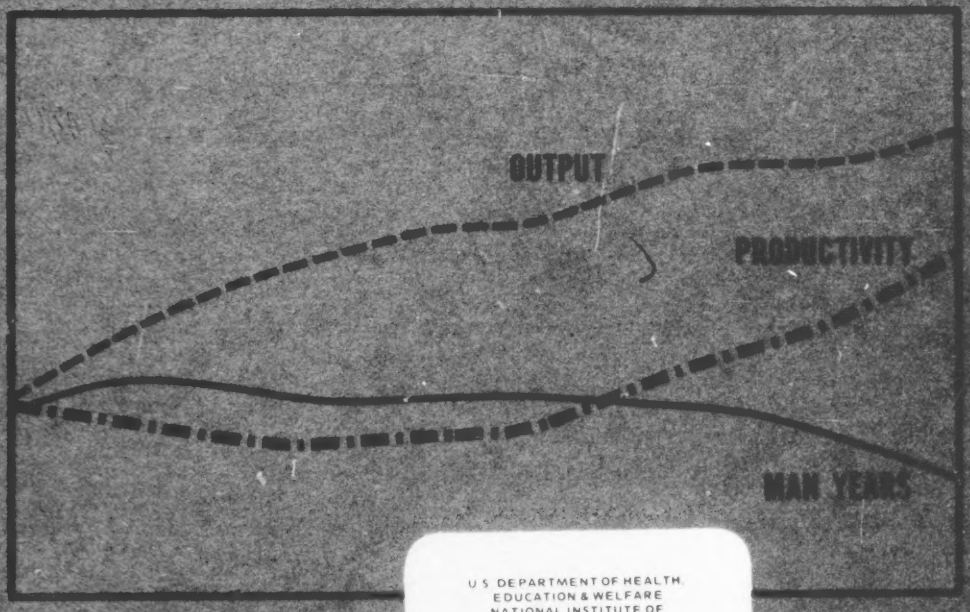
REPORT ON FEDERAL PRODUCTIVITY

VOLUME I

Productivity Trends, FY 1967 - 1973



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JOINT FINANCIAL MANAGEMENT IMPROVEMENT PROGRAM

JUNE 1974

CE002873

FOREWORD

In June 1973, a joint project team of the Office of Management and Budget, the Civil Service Commission, and the General Accounting Office submitted its final report on a three-phase project for measuring and enhancing Federal productivity. This study concluded that the productivity measurement system should be made permanent and that an annual report should be submitted to the President and the Congress.

A memorandum of July 9, 1973, to the heads of executive departments and agencies, from the Director of the Office of Management and Budget authorized continuance of the annual productivity review and assigned responsibilities for the continuing program.

The Joint Financial Management Improvement Program has assembled this annual report on Federal productivity. The report is presented in two volumes. Volume I reports on productivity trends for FY 1967-1973 and comments on the causes of productivity increases and decreases. Volume II consists of a series of productivity case studies.

The productivity program is a truly collaborative effort involving the participation of a large number of agencies. Important contributions have been made by the Bureau of Labor Statistics, the General Services Administration, the General Accounting Office, and the Civil Service Commission, as well as the 46 agencies which furnished productivity measurement data and used it in managing their programs. Officials of the agencies involved prepared most of the case studies appearing in Volume II.

This report indicates that considerable progress has been made in the measurement of productivity in the Federal Government but that there are many opportunities for further productivity improvements. We hope that this report will be useful in stimulating increased interest in this important program.

Donald C. Kull

Donald C. Kull, Executive Director
Joint Financial Management
Improvement Program

June 1974

REPORT ON FEDERAL PRODUCTIVITY
VOLUME I
PRODUCTIVITY TRENDS, FY 1967-73

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CHAPTER 1

INTRODUCTION

Productivity may be defined as the ratio between the units produced or services provided by an organizational unit (output) and the resources consumed in its production (input) during a specified period of time. A productivity index measures the efficiency of the producing organization over a period of time by comparing the current output/input ratio with that of a previous base.

Productivity measures have long been used in many industries and in some governmental operations. For almost a century the Federal Government has published data on the private sector of the economy and in recent years data has been published on productivity trends in foreign countries. Until recently there have been only limited efforts to measure the productivity of large numbers of Federal employees on a continuing basis. Many people have assumed that it is not practicable to measure the productivity of Federal employees and that governmental employees are not very productive. A public opinion study conducted for the National Commission on Productivity by Louis Harris showed that only 11 percent of the people polled thought that government workers had above average productivity. By contrast, 42 percent of those polled thought that doctors and nurses had above average productivity and 21 percent thought that factory workers had above average productivity. The only occupational group with a lower rating than government workers was clerical workers with 9 percent. When asked what groups of workers had below average productivity, 39 percent of those polled listed government workers. The next highest group was repairmen with 24 percent.

Fortunately there now are some voices on the other side of this issue. Senator William Proxmire, a foremost critic of Federal waste, made a speech in the Senate on May 13, 1974. In this speech he said, "Government has many faults, but the study of productivity in the Federal Government shows that many, many improvements have been made, far more agencies have improved their efficiency than have seen it reduced, and the American people are being served by their government in a far more efficient and productive way than before." (See Appendix II for full text of Senator Proxmire's remarks.)

REASONS FOR MEASURING PRODUCTIVITY

There are many valid reasons for measuring productivity in the Federal Government. Some of the major reasons are summarized below.

First, productivity measurement provides a basis for assessing the results of management actions. Federal Government activities currently represent a substantial part of the gross national product. Governments at Federal, State, and local levels now employ about 13 million people, or one out of every six American workers, and have a payroll of about $150 billion. In recent years the Federal Government has made substantial investments in new equipment. For example, the government has invested over $3-1/2 billion in about 6,000 computers--most of which were installed to replace human hands coping with the mounting volume of records and transactions and demand for data. Without some data on output per man-year it would be very difficult to assess the benefits of this investment. Actually, this is one of the most tangible benefit areas for which productivity data has been collected. For example, among 14 agencies which conduct transactions with the public--including the Social Security Administration and the Internal Revenue Service--and employ about 160,000 people, there have been productivity gains in excess of 3 percent per year, amounting to about $340 million over the six year period. Productivity measures provide a convenient scorekeeping technique for summarizing results of past efforts to improve productivity. Productivity measures also may reveal emerging trends and assist managers in taking steps which can influence these trends.

A second key reason for measuring productivity is to analyze future investments or other changes in organization and management practices so as to judge the prospective benefits versus the time and cost of obtaining them. Analyses of the causes of productivity increases and decreases can help a manager determine what management techniques have proved useful and which techniques need further study. If a manager has responsibility for two or more operations of a similar nature, productivity trends for the different operations can be useful in comparing their efficiency. There may be workload or environmental considerations which would suggest a different level of efficiency for different plants, but the measurement system provides a useful diagnostic tool.

Over the long run one of the most important uses of productivity trend data should be in manpower and budget planning. Past efforts to use productivity measures in the overall Federal budget process have not been entirely successful. As the quality of the measures improves, and managers at various levels gain an increasing understanding and more confidence in the productivity measures, there should be further progress in this area. In addition, there are many opportunities for use of productivity data in the budget process at operational levels. There have been cases in the Department of Defense, the National Labor Relations Board, and other organizations where productivity measures have been used effectively for relating workload requirements to manpower needs.

A third reason for measuring Federal productivity is that it can contribute to greater credibility. It can provide information to top officials of the government, members of Congress, economic analysts, and the general public, as to the relative trends in the efficiency of governmental activities. The development of the Federal productivity measurement system has helped refute some of the arguments and public impressions about nonproductivity of Federal employees.

SUMMARY OF PAST EFFORTS

In response to a request from Senator Proxmire in the Fall of 1970, the General Accounting Office, the Office of Management and Budget and the Civil Service Commission undertook a joint review of the feasibility of measuring productivity in the Federal sector.

Phase I of the joint project consists of a survey and feasibility study which led to a decision to begin the collection of data, development of a measurement system, and related analytic activities.

During phase II of this cooperative effort the three agencies, with important assistance from the Bureau of Labor Statistics, began efforts to develop overall productivity indexes, to study ways to improve use of existing measurement systems, to study ways to improve use of unit cost measures and capital project planning, and to document and encourage good practices in applying measurement techniques.

An initial measurement system was developed and productivity data was collected from 17 agencies for FY 1967 through FY 1971.

During Phase III of this joint study the measurement system was refined and coverage was expanded to include 187 separate organizational elements in 45 agencies, 774 different outputs, and about 60 percent of total Federal employment. An important part of the effort during this phase was a comprehensive analysis of the causes of productivity increases and decreases.

The results of this work were published in a report entitled, "Measuring and Enhancing Productivity in the Federal Government" dated June 1973. Among the lessons learned from this three phase joint effort were the following;

1. It is practicable to measure productivity for large segments of the Federal sector and there should be a continuing program for measuring and enhancing productivity with an annual report to the President and the Congress.

2. Productivity indexes should be used primarily as trend indicators.

3. The most important use of productivity indexes is in analyzing the causes of productivity change.

4. It can be expected that there will be fluctuations, both up and down, among Federal activities from year to year. Some of these fluctuations may not be subject to direct control by Federal managers.

5. The annual report should deal with trends in cross-cutting functions rather than identifying individual agencies and activities.

CONTINUING PROGRAM

Based on recommendations in the June 1973 report, action has been taken to provide a continuing Federal program for measuring and enhancing productivity. A July 9, 1973, memorandum from the Director, Office of Management and Budget, contained in Appendix III, assigned responsibility for the continuing program as follows:

1. General policy guidance for the continuing program is to come from the Office of Management and Budget.

2. The Bureau of Labor Statistics has responsibility for collection of the data and construction of the indexes.

3. The Civil Service Commission is responsible for leadership, policy guidance, and technical assistance in the personnel management aspects of productivity.

4. The General Services Administration is responsible for providing technical assistance and guidance to agencies in developing and using work measurement and productivity measurement systems, and in developing productivity improvement programs with respect to procedures and mechanization projects.

5. The Joint Financial Management Improvement Program (JFMIP) is responsible for analysis of factors causing productivity change, preparation of an annual report to the President and the Congress, and efforts to expand coverage and improve representativeness of the productivity measures.

Of course, the agency officials who develop and use the productivity measures are the key to a successful program.

THIS YEAR'S EFFORTS

In a response to a data call from the General Services Administration, 46 agencies have submitted productivity data for FY 1967-73. The data base has been expanded somewhat from that used in the previous report. Man-year coverage is now about 61 percent of the total Federal civilian employment. The number of participating organizations has increased from 187 to 200, and the total number of output indicators has risen from 774 to over 850.

Productivity data has been collected and the indexes compiled by the Bureau of Labor Statistics, using the methods which BLS uses for productivity figures pertaining to the private sector. The indexes which have been used are based

on output per man-year as in the private sector. They do not reflect other costs, such as the amortization of capital investment, because the accounting and reporting techniques for doing this on a comprehensive basis are not available. Some of the participating agencies have developed unit cost systems which permit them to express productivity in terms of total input costs, but for many other agencies this has not been possible.

The methods used for developing the productivity measures and the output indicators are generally the same as those used in the report issued in June 1973.[1] A substantial improvement has been made in the quality of the output indicators for selected organizations. The most significant changes from last year in the measurement systems occur in the Postal Service, and overhaul and repair categories, which are discussed in separate chapters.

To assist in analysis of the productivity data, the JFMIP, with collaboration from GSA, BLS and CSC, organized a series of workshops. Separate workshops were held for most of the major functional categories used for reporting productivity. These workshops were essential in obtaining a better understanding of the causes of productivity changes. They provided a good opportunity for people from different agencies to share experiences and learn from each other. There also has been a great deal of informal consultation with agency officials by representatives of BLS, GSA, and JFMIP.

A number of special activities were conducted during the year. In December 1973, JFMIP sponsored a quality measurement workshop and the proceedings have been published. JFMIP had collaborated with Region IX of HUD in design of a total measurement system, with TVA in development of a model productivity measurement system for power operations, and with the Navy in testing ways of measuring shipyards productivity. Close working relations have been maintained with the National Commission on Productivity and the International City Managers Association, and a limited amount of technical assistance has been furnished to State and local government productivity efforts.

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[1] A detailed explanation of methods may be found in Special Report #1, The Permanent Measurement System, December 1973.

Capital Investment. The June 1973 report gave special attention to the area of capital investment for productivity. This continues to be an exceedingly important area. Many organizations have identified automation and capital investment as major reasons for productivity increases. Many have also identified the problems in obtaining capital funds on a timely basis as major factors restricting their ability to achieve further productivity improvement.

To obtain further information in this area, GSA has undertaken a special capital investment study. The purposes of this study are to evaluate the extent of agencies' problems in acquiring productivity-increasing investments, to document alternative approaches currently being used successfully to finance capital investments, and to identify productivity-enhancing capital investment opportunities.

The purpose of the study is to update and expand the existing capital investment data base from 15 to approximately 40 major departments and agencies. Each department and agency has been asked to inventory its principal organizations, including field installations, and report each funded and unfunded capital investment project meeting certain specified criteria. Major emphasis was placed on obtaining information on unfunded projects. In addition, meetings have been held with representatives of those agencies known to have unique or imaginative capital investment financing arrangements in order to identify and evaluate alternative approaches and to determine the opportunities for transfer of technology and ideas among agencies. When all of this capital investment data is available, it will be analyzed to see what steps should be taken to provide capital funds on a more timely basis.

CSC Program. During the past year, the Civil Service Commission has established a Clearinghouse on Productivity and Organizational Effectiveness which serves as a focal point for the collection and dissemination of information on employee motivation and productivity improvement throughout government. About 400 productivity-related personnel management improvement projects have been reported to CSC in a survey of 850 Federal installations completed in April. They will form part of the data bank.

Studies of productivity-enhancing personnel management techniques have been undertaken in several agencies. An experiment in flexible work hours is underway in the Social Security Administration.

A study of the manner and extent to which attitudinal surveys can lead to productivity increases has been initiated in five Federal agencies. These are being conducted under the aegis of the National Commission on Productivity in cooperation with the National Academy of Public Administration. They are being evaluated by the Civil Service Commission for their long-term contributions to organizational productivity.

In addition, the Commission has conducted a survey of behavioral science applications throughout the Federal Government, both to identify successful programs for inclusion in its productivity data bank and to establish a base line for further research into improved personnel management techniques.

SCOPE OF THIS REPORT

This report is being presented in two volumes. Volume I includes information on the overall Federal productivity trend and on the productivity trends for the several functional categories. There also is an analysis of the causes of productivity increases and decreases. Consistent with the method used previously by the joint project team, productivity statistics are shown for functional groups rather than for individual agencies. This volume also includes information on the relation of productivity measures to other performance measures and on the cooperative work undertaken with State and local governments. Finally, this volume attempts to draw some conclusions on the future direction of the Federal productivity efforts.

Volume II consists of a series of case studies. These studies have been selected to show a diversity of types of operations and a diversity of measurement techniques. They provide direct examples of how some agency managers have been able to make effective use of productivity measurement in their efforts to improve performance.

CHAPTER 2

OVERALL PRODUCTIVITY TRENDS

This chapter will summarize the remaining portions of this report, giving attention to:

a. The coverage achieved in the FY 1973 sample and how its composition compares with that of last year's report.

b. The trends of input, output, and productivity from FY 1967 through FY 1973.

c. An in-depth analysis of the causal factors which influenced productivity trends, either up or down. These lessons are the most valuable findings of the productivity study.

A. COVERAGE

For the third successive year the coverage of the productivity review has been expanded. The number of agencies has grown only from 45 last year to 46 this year, but the number of separate organizational elements has increased from 187 to 200 and the number of outputs has grown from 774 to over 850.

The current man-year coverage of 1,733,000 is only slightly above last year's 1,727,000, but it includes a number of significant new elements, including:

Air Force Hospitals (6,485 man-years)
Naval Shipyards (601 man-years)
Forest Service - Timber Management (4,675 man-years)
Defense Mapping Agency (7,520 man-years)
Bureau of Prisons (3,991 man-years)

Increases for new elements have been largely offset by decreased employment in other areas, notably the Postal Service, which dropped from the FY 1972 man-year level of 707,000 to 684,000 man-years in FY 1973.

The percentage of the Federal civilian work force covered in the FY 1973 sample is 61 percent, compared to 60 percent last year.

There appear to be good prospects for some further expansion of the coverage, particularly in certain support functions (libraries, laundries, data processing activities, finance functions, etc.) and military activities (transportation, training, base operations, etc.).

The extent of coverage for the different Federal agencies varies widely. A number of organizations have been able to provide coverage for all employees. These include such organizations as the Postal Service, the Government Printing Office, the Bureau of the Mint, and the Bureau of Engraving and Printing (which have large repetitive type workloads). A number of other organizations with diversified type programs have also provided productivity data for all employees. An example is the Tennessee Valley Authority. A substantial part of TVA's employees are engaged in the production and distribution of electric power and other production-type programs, but TVA also has a wide range of research and development activities. It is encouraging to note that some organizations with regulatory and administrative responsibilities, such as the National Labor Relations Board and the Interstate Commerce Commission, have also been able to submit productivity data for all of their employees.

Many agencies have submitted data for substantial portions of their employment totals, while others have submitted data for only a small fraction of their total employment and a few have not submitted any productivity data. Agencies in these latter two groups generally are those concerned with research and development or other types of professional services which are non-repetitive and do not lend themselves readily to precise measurement.

Exhibit 2-1 shows the participating agencies and the extent of the coverage.

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EXHIBIT 2-1

LIST OF PARTICIPATING AGENCIES (FY 1971)

AGENCY	TOTAL MANYEARS (000)	MEASURED MANYEARS (000)	PERCENT MEASURED	NUMBER OF ELEMENTS
POSTAL SERVICE	684.2	684.2	100.0	1
CABINET DEPARTMENTS:				
Agriculture	101.1	52.8	52.2	15
Commerce	34.4	7.9	23.0	7
Defense	1,105.3	347.9	31.5	35
Health, Education & Welfare	105.6	87.2	82.6	11
Housing & Urban Development	19.1	7.9	41.4	3
Interior	70.7	35.0	49.5	21
Justice	46.7	18.8	40.3	14
Labor	13.4	9.5	70.8	5
State	24.2	2.9	12.0	4
Transportation	107.7	97.9	90.9	3
Treasury	111.8	83.8	75.0	13
COMMISSIONS:				
Atomic Energy	7.4	.1	1.4	1
Civil Rights	.2	.2	100.0	1
Civil Service	6.0	5.2	86.7	7
Federal Communications	1.7	.9	52.9	5
Federal Maritime	.3	.3	100.0	1
Federal Power	1.2	.9	75.0	1
Federal Trade	1.4	1.4	100.0	1
Interstate Commerce	1.8	1.8	100.0	4
Securities and Exchange	1.6	1.6	100.0	1
Tariff	.3	.1	33.3	1
ADMINISTRATIONS:				
Farm Credit	.2	.02	10.0	1
General Services	38.6	32.4	83.9	12
National Aeronautics and Space	28.4	.02	.1	1
National Credit Union	.5	.5	100.0	1
Small Business	5.5	5.5	100.0	1
Veterans	187.4	178.7	95.4	3
OTHERS:				
Civil Aeronautics Board	.7	.1	14.3	1
Environmental Protection Agency	9.4	.7	7.0	1
Federal Home Loan Bank Board	1.3	1.1	84.6	1
Federal Mediation & Conciliation Service	.4	.4	100.0	1
General Accounting Office	4.8	.5	10.4	2
Government Printing Office	8.9	8.1	91.0	3
National Foundation Arts & Humanities	.3	.3	100.0	1
National Labor Relations Board	2.4	2.4	100.0	1
National Science Foundation	1.2	1.2	100.0	1
National Transportation Safety Board	.3	.3	100.0	1
Office of Economic Opportunity	2.1	2.1	100.0	1
Panama Canal Company	15.6	15.6	100.0	2
Railroad Retirement Board	1.8	1.8	100.0	1
Renegotiation Board	.2	.2	100.0	1
Selective Service System	6.3	6.3	100.0	1
Smithsonian Institution	3.0	.8	26.7	1
Tennessee Valley Authority	24.2	24.2	100.0	3
United States Information Agency	9.7	2.3	23.7	3
TOTAL PARTICIPATING AGENCIES				
NON-PARTICIPATING AGENCIES	21.7	0	0	0
GRAND TOTAL	2,821.0	1,733.8	61.5	200

In addition to the "direct Federal civilian man-years" included in the sample, data on another 242,000 man-years were gathered and analyzed. These included:

--140,000 military man-years in functions (like medical services) that involved mixed military-civilian manning.

--43,000 man-years of foreign nationals in overseas base operations of the military.

--59,000 man-years of employment in Government-Owned-Contractor-Operated (GOCO) plants--14 Army and 8 AEC.

In total, then, measurement data has been obtained for about 2 million workers engaged in Federally funded activities.

B. INPUT-OUTPUT-PRODUCTIVITY TRENDS

Exhibit 2-2 shows the overall trends for the period FY 1967-1973--six elaped years from the base of FY 1967 chosen as 100 percent.[1] In addition to trends for the total sample, this chart divides the total into the three major universes covered--Defense, Postal Service, and Civilian agencies.

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[1]This is the same base year selected for the private sector by the Bureau of Labor Statistics.

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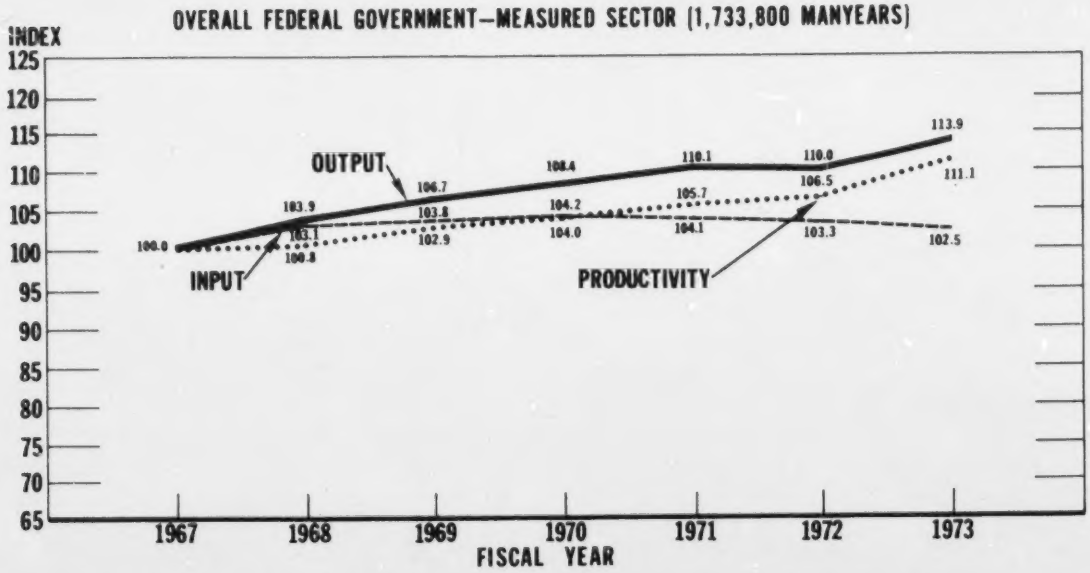
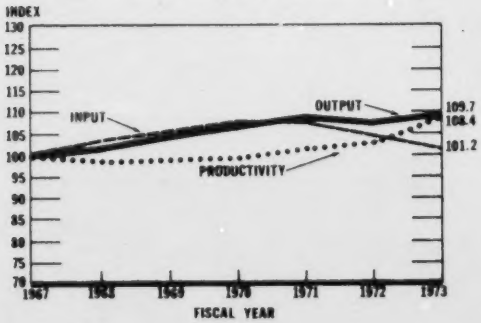
EXHIBIT 2-2

FEDERAL PRODUCTIVITY TREND BY MAJOR EMPLOYMENT SEGMENT FY 1967–1973

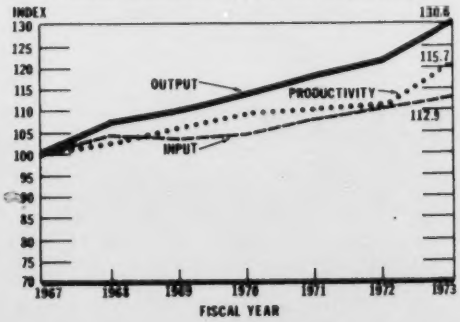
OVERALL FEDERAL GOVERNMENT–MEASURED SECTOR (1,733,800 MANYEARS)



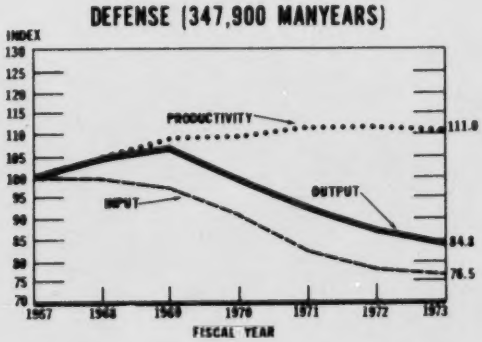
POSTAL SERVICE (684,200 MANYEARS)



CIVILIAN AGENCIES (701,700 MANYEARS)



DEFENSE (347,900 MANYEARS)



Output took a sharp upturn between FY 1972 and FY 1973 (3.5 percent) and ended the six year period at 113.9 (with FY 1967 as the base of 100). Input (man-years) continued the steady downturn experienced since the peak year of FY 1970 and ended the six year span only 2.5 percent above FY 1967. The combination of rising output and diminishing input results in a productivity gain of 4.3 percent from FY 1972 to FY 1973 and an ending productivity index of 111.1, which represents an average annual gain of 1.8 percent. The cumulative savings in labor costs represented by productivity gains during this period are almost $2 billion.

Exhibit 2-2, in addition to showing the trends for the total sample, shows separate trends for the three major groups of employees--Defense, Postal Service, and Civilian agencies.

DEFENSE

After increases in FY 1968 and FY 1969, output has declined steadily, largely as a result of the phasing-down of military activities in Southeast Asia. Despite the output reduction, the Department of Defense has been able to achieve productivity gains averaging 1.8 percent per year by decreasing input more rapidly than output. This is a significant achievement.

POSTAL SERVICE

The output and input trends were generally similar in the early part of the period but have diverged in the last two years as positive management actions have been taken to reduce labor input. The result has been a significant productivity gain, particularly in the last year when a gain of 5.6 percent was recorded. This high one-year change, of course, cannot be viewed as typical of future annual changes.

CIVILIAN AGENCIES

In the Civilian Agencies category there has been a steady growth in output from the FY 1967 base of 100 to an index of 130.6 in FY 1973. The increase from FY 1972 to FY 1973 was 7.1 percent and the average annual increase was 4.5 percent.

To handle this increasing output some input increases have been necessary. Input grew gradually to 112.9 in FY 1973. The increase from FY 1972 to FY 1973 was 2.5 percent and the average annual increase in input was 2.0 percent over the six year period.

Because the rate of staff buildup was significantly slower than the output growth, the productivity index has shown impressive gains. Productivity increased by 4.6 percent from FY 1972 to FY 1973. The FY 1973 productivity index of 115.7 represents an average annual gain of 2.5 percent.

FUNCTIONAL ANALYSIS

Continuing the plan of analysis followed last year, the total sample has been divided into 16 reasonably homogeneous functions (i.e., functions having similar output and process characteristics.) It is believed that indexes computed for such groups are more meaningful for overall analysis than 200 individual organizational units in 46 agencies. The functional indexes for FY 1973 are shown in Exhibit 2-3.

EXHIBIT 2-3

PRODUCTIVITY: FUNCTIONAL INDEXES

(FY 1973 INDEX (FY 1967 = 100)

FUNCTION	MAN-YEARS	OUTPUT	INPUT	PRODUC-TIVITY	CHANGE FY 1972-73	CHANGE AVE. RATE[1] FY 1967-73
Agriculture & Natural Resources	38,116	101.4	91.0	111.5	.6	1.8
Citizens' Records	160,743	131.8	109.8	120.0	2.8	3.1
Training and Education	31,918	116.0	114.7	101.1	.8	.2
Medical Services	202,351	112.0	113.4	98.8	3 7	-.2
Loans and Grants	33,290	145.6	112.4	129.5	-6.2	4.4
Postal Service	684,192	109.7	101.2	108.4	5.6	1.4
Power	27,682	177.4	130.0	136.5	-1.4	5.3
Reference Services	7,729	139.7	127.9	109.2	-4.4	1.5
Regulation	61,859	139.9	113.7	123.0	5.2	3.5
Specialized Manufacturing	16,113	137.1	107.0	128.1	-3.6	4.2
Transportation	113,537	136.0	110.5	123.1	5.5	3.5
Maintenance of Facilities	56,702	90.5	85.8	105.5	-2.5	.9
Overhaul & Repair	95,234	84.3	77.8	108.4	-1.9	1.4
Procurement and Supply	145,113	77.6	72.2	107.6	.9	1.2
Standard Printing	10,457	79.5	89.7	88.7	1.7	-1.8
General Support	48,769	93.6	67.5	138 7	4.8	5.6
TOTALS	1,733,805	113.9	102.5	111.1	4.3	1.8
GOCO Plants	59,281	103.2	75.2	137.2	-1.6	5.4

[1]The average annual rates of change used in this report were computed by the compound interest formula; slightly different rates would be obtained using other methods such as the least squares regression technique.

It is interesting to note that, while the overall productivity index shows an increase of 4.3 percent for FY 1972-FY 1973, there is a wide range of figures for the individual functions, with 10 functions showing increases and 6 functions showing decreases for this one year.

When the rate of change is expressed in terms of annual rate over a six year period (last column) there are only two of the functional categories which show decreases in productivity. The other 14 functions show average annual increases ranging from 0.2 percent to 5.6 percent.

The two functions with a downward trend over the 6 year period are medical services and standard printing. Both pose special problems in productivity measurement:

--In the case of medical services the number of employees per patient day has been increasing because of changes in complexity and quality of services furnished, and techniques of revising the measurement system to reflect these changes have not been developed. Some efforts are now underway, however, to improve the measures used in this area (see Volume II, Chapter 2).

--Printing productivity is reported to be affected by the fact that the easy work is being contracted out, leaving the difficult jobs in house.

Despite the trends, the organizations involved in these functions have been active in efforts to improve productivity. Some indications of their success may be seen in the productivity gains for both functions during FY 1973.

Most of the functions showing impressive gains over the 6-year period have experienced rather substantial increases in output. These include Postal Service, loans and grants, power, specialized printing, regulation, and transportation. The overhaul and repair function index was completely revised this year due to a change in data reporting systems and weighting of outputs for aircraft and other products. Efforts are underway to produce better output measures for this function.

Because of the importance of the functional analysis, this report includes a separate chapter on each of the 16 areas, with more detailed information on trends and causal factors. There is also a separate chapter on the GOCO plants, which as a group show a most impressive productivity gain of 37.2 percent for the six-year period.

FLUCTUATION IN PRODUCTIVITY BY ORGANIZATIONAL ELEMENT

A distribution of organizational elements showing the changes from 1972 to 1973 is shown in Exhibit 2-4. The graph shows that 80 of the 200 elements fell within the range ±5 percent. Thirteen elements showed gains for the year of more than 30 percent, while 4 elements had a productivity decline of more than 30 percent. Experience has shown that, even with an overall upward tend, it is not realistic to expect every organization to show productivity gains every year.

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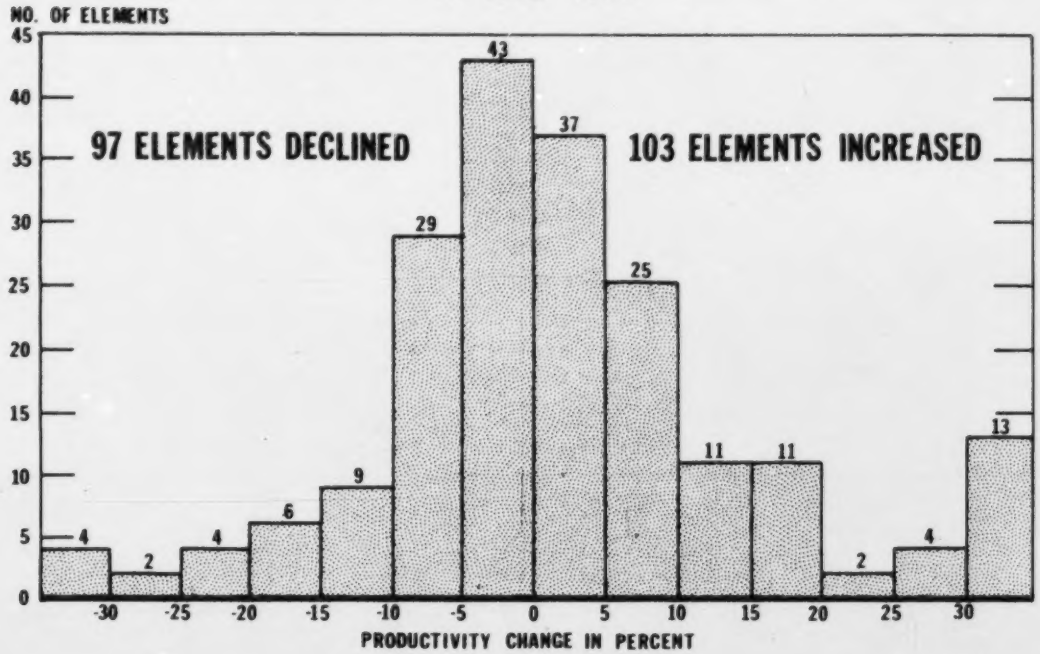
The trend over a period of years is generally more meaningful.

EXHIBIT 2-4

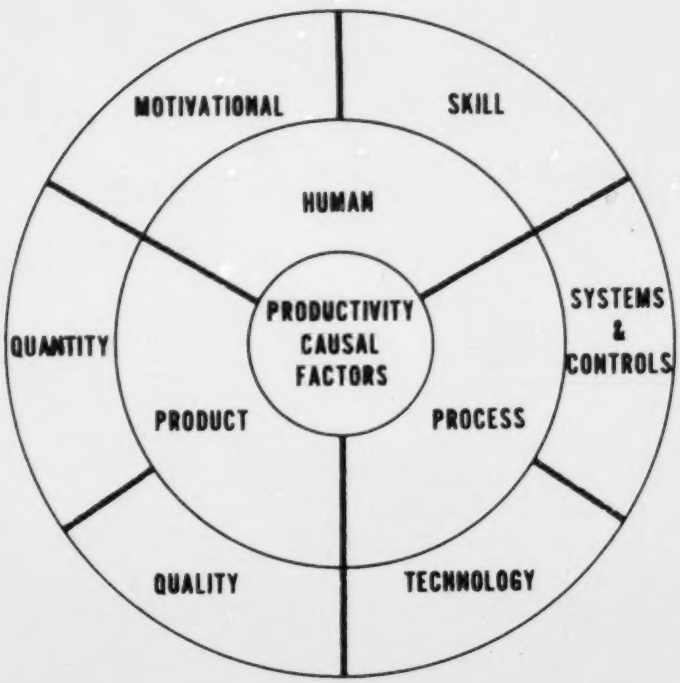
DISTRIBUTION OF PRODUCTIVITY CHANGE FOR INDIVIDUAL ELEMENTS FY 1972–1973



C. CAUSAL FACTORS

Many factors have contributed to increases and decreases in productivity. These may be classified into three broad categories, (1) human or personnel-type factors, (2) process factors, and (3) product factors. Each of these categories may be subdivided as shown in Exhibit 2-5. Underlying all of these factors, of course, is the need for leadership, imagination, and judgement on the part of managers.

CAUSAL FACTORS AFFECTING PRODUCTIVITY CHANGE



HUMAN FACTORS

The human or personnel-type factors fall generally into two areas, motivational influences and skill levels. Many specific factors of both types have been identified by Federal agencies as causes for productivity increases and decreases. The principal items are shown in the following chart. (Exhibit 2-6). It should be recognized, of course, that classifications such as this are somewhat arbitrary and cannot adequately reflect the interrelationships of some of the items and categories.

EXHIBIT 2-6

HUMAN FACTORS IN PRODUCTIVITY CHANGE

(Reported in 1973 Data Submissions)

MOTIVATIONAL

POSITIVE FACTORS

- Employee participation
- Better communications
- Job enrichment
- Incentive awards
- Equal Employment Opportunity
- Personnel interchange
- Team approach
- Employee-customer interaction
- Effective grievance procedures

NEGATIVE FACTORS

- Promotion freezes
- Grade reductions
- Hiring freezes
- Reduction in force
- Excessive travel
- Menial jobs

SKILL

POSITIVE FACTORS

- Intensified training
- Cross training
- Job restructuring
- Upward mobility
- Employee development

NEGATIVE FACTORS

- High personnel turnover
- Retirement of skilled personnel

Motivational Considerations

There is ample evidence that the provision of a good working environment and interesting work assignments can have a positive influence on employee productivity. The lack of such conditions often has the reverse effect.

Experience in a number of agencies has demonstrated that productivity of employees increases as they are given meaningful opportunities to participate in the planning of their work activities. For example, improved two-way communications between regional office staff and field economists in a regional office of the Bureau of Labor Statistics was the principal factor contributing to increased productivity in that office. (See case study in Volume II, Chapter 15.)

Among the other positive actions which can be taken are job enrichment programs, employee opinion surveys, incentive awards, constructive equal employment opportunity programs, personnel interchange opportunities and use of a team concept. Functions reporting benefits from these actions in 1973 were those involved in specialized training, maintenance of facilities, overhaul and repair, procurement and supply, and general support.

In a printing activity the productivity of a group of employees increased when they were given an opportunity to deal directly with their customers, thus achieving the satisfaction of rendering good customer service.

Effective grievance procedures can add to employee satisfaction and help create a productive environment, according to Postal Service experience. On the other hand, lack of clear-cut, fair grievance procedures can lead to discontent and low productivity.

Many agencies reported that reduced productivity resulted from promotion freezes, grade constraints, hiring freezes, reduction in force, and the existence of a number of menial or boring jobs. In fact, 13 of the 16 functions reported these factors as having a negative influence.

When such conditions exist, there is an added need for the manager to use his ingenuity in finding positive factors to offset the negative circumstances which may be, at least

partially, beyond his control. The first step is to identify the factors that are having adverse effects on employee morale and performance. This is one of the objectives of a productivity program.

Skill Considerations

Training has been cited by many participants in the productivity program as a major factor contributing to productivity improvement. It is particularly important where programs or work methods are changing. Some organizations have had great success with cross-training of employees to enable them to perform a wider variety of tasks. In other cases good results have been obtained by emphasizing specialization. The important thing is that the training must be geared specifically to the requirements of the workload and the organization involved.

Lack of proper training is often on of the causes for decreases in productivity. In some cases, people have said that the requirement to devote substantial time to training has contributed to productivity declines. Any temporary disadvantages, of course, would hopefully be offset, in the long run, by the benefits of the training.

Job restructuring can be a means of making maximum use of employees' skills. Special upward mobility programs and emphasis on employee development can provide opportunities for employees to apply their skills and encourage them to develop new skills.

High turnover and loss of skills through retirement were mentioned as deterrents to productivity improvement by agencies in all functional groups. This might reflect, in some measure, the higher than normal rates of retirement being experienced at the present time. For example, TVA refers to the exodus of first generation employees from this organization, founded in 1933.

PROCESS FACTORS

The most frequently cited causes for productivity change were in the category designated "Process Factors." This is a rather imprecise designation for a host of (1) systems, methods, and procedures factors on the one hand; and (2) physical resource, or "technology," factors on the

other hand which include materials, facilities, and equipment. The principal items reported in this year's review are shown in the following chart.

EXHIBIT 2-7

PROCESS FACTORS IN PRODUCTIVITY CHANGE

(Reported in 1973 Data Submissions)

SYSTEMS AND CONTROLS

POSITIVE FACTORS

- Planning and scheduling
- Systems analysis
- Revised procedures and work flow
- Work simplification
- Statistical Sampling procedures
- Performance standards
- Value analysis
- Use of data generated by others
- Reorganizations
- Consolidation and reduction of functions and facilities

NEGATIVE FACTORS

- One-year funding
- Personnel ceilings
- Excessive approval procedures for capital investment

TECHNOLOGY

POSITIVE FACTORS

- Automation, mechanization, computerization
- Capital investment
- New or modernized facilities
- Research and development into materials, facilities, and equipment

NEGATIVE FACTORS

- Budget restraints on capital spending
- Long lead time to introduce new technology (as long as 5 to 10 years)
- Outmoded facilities and equipment

Systems and Controls Considerations

Efficient use of the many resources available to a manager must begin with careful planning and a systematic approach to the organization's mission. These may lead to revision of procedures, work simplification, reorganization, changes in geographical boundaries, consolidation of facilities, or other changes.

Changes in procedures have contributed significantly to productivity improvements in regulatory and administrative agencies. One organization reported that new audit procedures resulted in a one year productivity gain of 22 percent. In another case work simplification resulted in a 50 percent reduction in processing time. The Nation Labor Relations Board has made a number of improvements in its administrative operations and is achieving good productivity results. (See Volume II, Chapter 7 for a discussion of NLRB's approach to productivity measurement and improvement.)

Use of sampling procedures in such diverse operations as voucher examination and inspection of manufactured products can lead to productivity increases.

Many organizations which have productivity measurement systems use the historical data from these systems in developing performance standards which provide a further way to evaluate current performance. Value analysis techniques can also be helpful.

Use of input data from other sources provides an obvious potential for productivity improvement. One of the factors contributing to productivity gains for the Social Security Administration is the increasing emphasis on obtaining data from large organizations in a machine-readable form. This minimizes the SSA data preparation job. (See Volume II, Chapter 13 for further information on the SSA productivity effort.)

The productivity benefits achieved by reorganization of functions and consolidation of facilities have been demonstrated within the Department of Defense. Volume II of this report contains relevant case studies on the Defense Mapping Agency (Chapter 4), the Defense Supply Agency (Chapter 5), and the Air Force Logistics Command (Chapter 6). Of course, in the short run, reorganizations can result in disruptions and productivity declines.

Contracting practices can have either a positive or negative impact on productivity. If an organization is assigned a new complicated task not consistent with available in-house skills, facilities, and overheads--it is certainly more productive to contract out the work than to gear up for the job, particularly if the task is of short duration or if a major capital investment is required. On the other hand, in the case of printing, the immediate effect of contracting out the simpler, high volume jobs is reported to be reducing productivity by leaving the more complex, short deadline work for in house performance. This case needs further analysis to be certain that the productivity and cost-effectiveness implications of this form of contracting-out are fully assessed.

Many organizations, from time to time, are faced with other administrative constraints--limited budget, personnel ceilings, time consuming approval requirements, for capital projects etc-which cause productivity declines or interrupt productivity gains.

Technology Considerations

Economists have reported that, over the long run, from 40 to 60 percent of the productivity improvement in the private economy has been the result of technology change. The experience of government activities is similar, and there are some indications that the percentage figures for certain types of activities may be even higher. In high repetitive activities technology change can bring dramatic improvements in productivity. In fact, agencies in every one of the 16 functional areas cited capital investment as either the major factor, or at least one of high significance, in productivity improvement. Examples are numerous:

--Automation has become a way of life for many of the repetitive operations of the Social Security Administration and has contributed substantially to the upward productivity trend for that agency for 10 years. As increasingly sophisticated computer equipment becomes available, there will be opportunities for further improvement.

--The Department of Veterans Benefits of the Veterans Administration has achieved productivity gains

through the use of automatic typewriters, and centralized transcription facilities for high-volume correspondence production.

--Many of the productivity gains of the Bureau of the Mint, the Bureau of Engraving and Printing, and the Army Materiel Command would not have been possible without improved equipment and increased automation (See case studies contained in Volume II).

--The steady up-trend in productivity of the transportation function reflects automation, particularly in FAA automatic air traffic controls in terminals and flight service stations.

--Representatives of printing organizations described the use of multi-color high speed presses, mechanical collators, automated binding and folding machines, electronic photo composers, etc. as being the basis for productivity change.

--In the vast network of supply and warehousing activities, materials handling, automated conveyor systems, tractors, labeling and stuffing equipment, and strapping devices have been cited as being conducive to improved productivity.

Lack of capital investment funds on a timely basis is cited frequently as a cause of productivity declines, or as reasons for not being able to take advantage of opportunities for increasing productivity. In some cases, relatively minor investments in improved equipment can produce a rapid payoff.

The traditional governmental budget system does not make such investments easy. Productivity investments must compete with funding for program requirements. In some cases, the time required for obtaining budget approval for relatively minor capital investments would exceed the time required to amortize the investment through savings. The option of borrowing funds is not available to most agencies. Many agencies lack qualified staff for seeking out potential improvements.

The June 1973, report "Measuring and Enhancing Productivity in the Federal Government" dealt with the problem of

capital investment for productivity at some length. A detailed presentation may be found in "Special Report IV - Analysis of Productivity Enhancing Capital Investment Opportunities."

The General Services Administration is spearheading efforts to learn more about this problem and to seek practical solutions. As indicated in Chapter 1, GSA has requested data from the various agencies. Reports will be prepared when the data has been analyzed.

It is not clear yet whether there will be any Government-wide changes in procedures. In any event, individual agencies can and should take the initiative in exploring this problem.

Some agencies have attacked this problem with very good results. The Department of the Army is a good example. During FY 1973, the Army Materiel Command provided approximately $500,000 to the Armament Command for capital investments in GOCO plants, with special procedures which permitted very prompt authorization at a field level of capital investments with a quick payback. This amount was used for 24 separate projects with cost estimates ranging from a few thousand dollars to $75,000. The savings realized during the first year totaled about $1.8 million and most of these savings will recur in future years.

Based on this favorable experience the Army expanded the program to cover ammunition-producing arsenals and authorized a level of $1.9 million for FY 1974. There has now been a decision to expand the program further to cover arsenals and supply and maintenance depots.

The Bureau of Engraving and Printing has used imaginative leadership in finding ways to finance new equipment needed to modernize operations and improve productivity. Through negotiations with equipment suppliers, the Bureau has developed lease-purchase arrangements without the usual contingent liability funding provisions. Arrangements are also being made to add a surcharge for the Bureau's services so that additional capital equipment can be obtained through the revolving fund.

The methods used by each agency would depend upon its own appropriation structure and management practices, but

the examples of the Army and the Bureau of Engraving and Printing suggest that there are real possibilities for overcoming some of the problems associated with obtaining capital funds for productivity improvements. Certainly there can be increased attention to the leasing of equipment and facilities as an alternative to direct purchase. The timing for realization of productivity savings should be considered in making benefit/cost analyses of various options.

As programs and products change and as improved technologies became available, facilities must be modernized, both to meet program requirements and to remain efficient. The need to continue operations in outmoded facilities has often been cited as a cause for productivity declines. Aggressive research and development efforts can lead to improved equipment and techniques which increase productivity. Sophisticated diagnostic techniques can help in identifying problems and evaluating results obtained from new equipment.

PRODUCT FACTORS

Productivity changes are affected substantially by a set of factors associated with the product of the work--checks written by Social Security, coins minted by the Bureau of Mint, electric power produced by the Bonneville Power Administration, etc. For convenience, these factors may be grouped in terms of quantity factors and quality factors as shown in Exhibit 2-8.

EXHIBIT 2-8

PRODUCT FACTORS IN PRODUCTIVITY CHANGE

QUANTITY	QUALITY
POSITIVE FACTORS	POSITIVE FACTORS
--High Volume	--Simplification of product
--Stability	--Easier-to-produce mix
--Predictability	
--Economy of Scale	NEGATIVE FACTORS
NEGATIVE FACTORS	--Greater complexity of product due to such matters as:
--Declining workload	.Additional data requirements
--Uncertainties in future workload	.Change in level of service
--Lag in work force adjustment	.Changes in frequency of service
--Unavailability of supplies	.Environmental considerations
	.Health and safety requirements

Quantity Considerations

Sheer volume of the workload is one of the most significant productivity factors. There have been increases in output in most of the cases where productivity gains have occurred. Gains in productivity are usually easier to achieve when the workload is going up or when it is stable. Even where the workload fluctuates, if it is reasonably predictable it may be possible to increase productivity.

Declining workloads, particularly those which have not been planned in advance, usually are associated with declining productivity. It often is not possible to adjust labor input as rapidly as the decline in workload.

Economy of scale is an important consideration. There usually is a strong correlation between productivity indexes and percentage of capacity used for production-type operations. If an increase in workload necessitates construction of new facilities, reopening of outmoded facilities, or extra work shifts, there could be a drop in overall productivity rather than the increases usually associated with higher volume. Changes in product mix can also affect the degrees of utilization of different portions of a plant and thus influence the productivity.

Particularly during the current period of shortages of many materials, the availability of supplies can affect production rates and cause scheduling problems or inefficient use of labor resources. Even in administrative areas, shortages of supplies can affect employee productivity.

Quality Considerations

No analysis of productivity changes can ignore quality considerations. In an ideal situation product quality remains constant and productivity indexes portray an accurate picture of changes in labor efficiency.

In the real world there usually are changes in the complexity of the products or services of government organizations. To the extent possible, productivity measurement methods should be revised to take into account significant changes in product complexity or quality. For many reasons there are imperfections in the ability of most organizations to make such adjustments promptly and accurately. Thus, the productivity indexes often are influenced by product complexities.

Product improvement may be an important organizational objective. Analysis of productivity indexes can help identify the extent to which additional labor input is required to achieve this objective. Proposed changes in methods to achieve greater efficiency must be evaluated in terms of their impact on product quality. In some cases it may be possible to change the level or frequency of certain

services without diminishing the achievement of basic program goals. Analysis of productivity trends can help in the trade-off analyses that managers have to make.

Some organizations have reported declines in productivity because of need to comply with increasingly strict environmental requirements or health and safety standards. Such factors can increase the labor requirements and can also affect product quality in some cases.

The importance of quality considerations underscores a point made elsewhere in this report: productivity measures must be analyzed in relation to a variety of other measures of program accomplishment and effectiveness.

MAJOR OBSTACLES TO PRODUCTIVITY IMPROVEMENT

Based on analysis of the factors causing productivity increases and decreases, the major obstacles to productivity may be summarized as follows:

1. Difficulty in obtaining funds for capital equipment and facilities on a timely basis.

2. Organizational and administrative rigidities which hamper management efforts to make most effective use of available resources in meeting program requirements.

3. Sudden changes in program or workload requirements.

4. Lack of widespread understanding of use and value of productivity measurements and of the opportunities for productivity improvement.

OUTLOOK FOR FUTURE IMPROVEMENTS

In the workshop discussions and through questionnaires, agency representatives of each functional group were asked to comment on forecasts of future productivity trends and on factors expected to affect the trends. A brief summary of these veiwpoints is provided in the remaining paragraphs of this chapter.

1. With respect to human factors, about half of the functional areas commented specifically on human factor actions, in process or planned, which would beneficially affect

future productivity. Most of these stressed improved training programs. Continued experimentation with employee attitude surveys and follow through efforts were stressed, particularly by organizations concerned with industrial type functions (overhaul and repair, procurement and supply). Another functional group (maintenance of facilities) mentioned the use of more skilled craftsmen for building maintenance. The power group mentioned plans for more effective manpower utilization studies.

As an overall comment, it appears that agencies should be encouraged to give more attention to the personnel factors in their productivity programs, and to be sure their personnel management organizations participate in planning productivity enhancement efforts.

2. With respect to process factors, most agencies identified actions of this type as the most likely to affect future productivity gains. Four kinds of actions were mentioned:

--Consolidation of facilities or activities.

--Automation, with major attention to computerization.

--Procedures improvement and work simplification.

--Standardization of practices and products where multiple activities are involved.

3. With regard to product factors, again most organizations had comments with respect to these causal factors. The principal emphasis was given to:

--Improving output measures where quality or complexity changes are involved.

--Developing better measures where proxy or surrogate measures such as "population served" are used in coverage of functions not now fully represented in the sample. Functional groups mentioning such opportunities were:

--Agriculture and Natural Resources
--Citizens Records
--Education and Training

--Reference Services
--Maintenance of Facilities
--Overhaul and Repair (shipyards)
--General Support

Finally, there is a growing awareness that unless productivity measures and analyses lead to setting targets for future achievements the full value of this effort will not be realized. This will be a key theme of the productivity management programs in the coming year.

CHAPTER 3

PRODUCTIVITY TREND

AGRICULTURE AND NATURAL RESOURCES

NATURE AND SCOPE

This function includes organizational elements responsible for management of the nation's natural resources. It includes those activities responsible for conservation and replacement of natural resources, measurement of atmospheric conditions, and management of Federally-owned lands.

This function includes over 38,000 man-years comprising eleven organizational elements within three agencies. The elements within this function are measured through 35 outputs. The data base is shown in Exhibit 3-1.

EXHIBIT 3-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Agriculture:			
Forest Service:			
Recreational Public Use	2,616	1	Visitor capacity
Timber Management	4,675	2	Board feet harvested
Soil Conservation Service	15,690	21	Watershed work plans completed
Commerce:			
National Oceanic and Atmospheric Administration	2,184	1	Observations taken
Interior:			
Land Management:			
Cadastral Surveys	424	1	Miles of line surveyed
Forage Production	382	1	Animal unit months
Timber Production	670	1	Board feet of timber produced
Bureau of Reclamation	8,801	4	Acre feet supplied
Department of Fisheries and Wildlife	655	1	Pounds of fish raised
Geological Survey-Topographic	1,764	1	Thousand square miles mapped
Mines-Helium Production	255	1	Cubic feet of helium extracted
Total	38,116	35	

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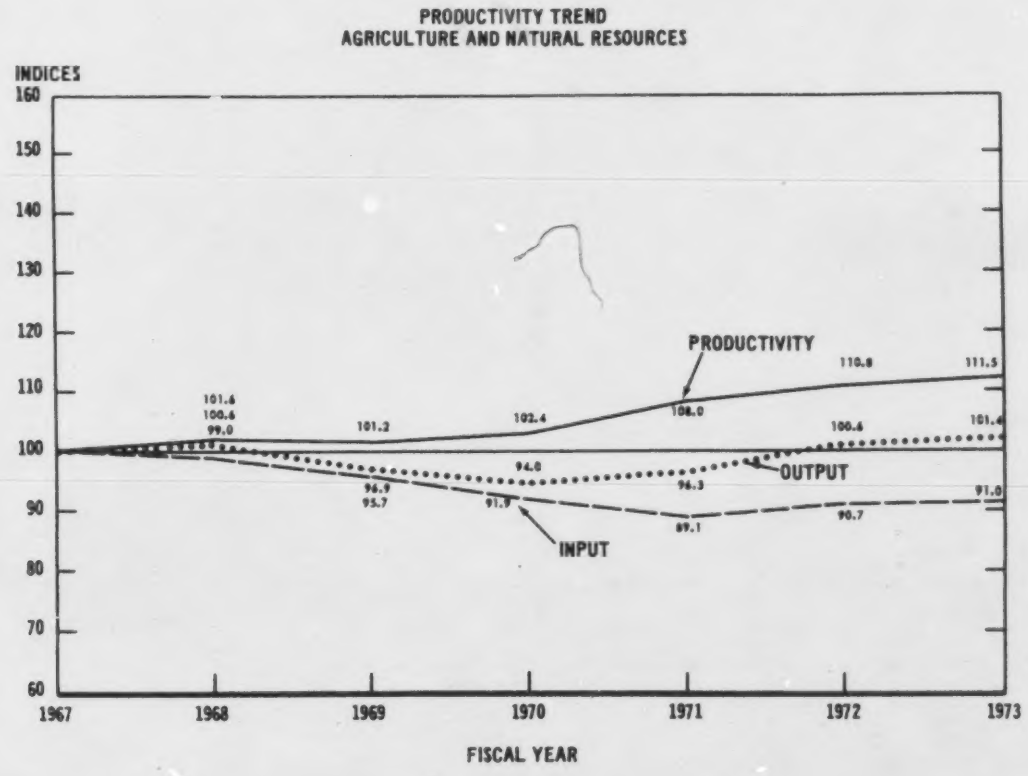
PRODUCTIVITY TREND

Productivity for this element remained stable through FY 1970 as both input and output declined. In FY 1971 productivity jumped about 6 percent, then maintained a slower upswing through FY 1972 and FY 1973. This upswing was caused by a rising output related to a relatively level input. The productivity gain was achieved by intensification of the rate of capital investment and automation. In FY 1973 the productivity index was 111.5, which represents an average annual growth of 1.8 percent. The productivity trend for this function is shown below in Exhibit 3-2.

EXHIBIT 3-2

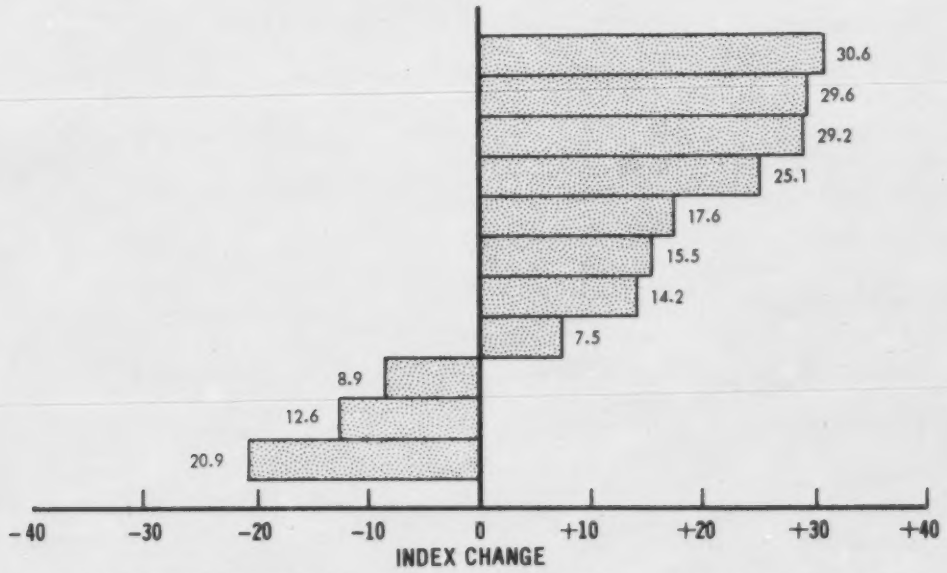


Productivity increased for eight of the eleven organizational elements and decreased for the other three between FY 1967-1973.

Seven of the eight elements followed the general trend of productivity gains when output is increasing. Only one element which had an output decline was able to achieve a productivity gain. Input for most of the elements was sharply reduced. Four elements experienced input reduction in excess of ten percent over the 6-year period. A frequency distribution of elements is shown in Exhibit 3-3.

EXHIBIT 3-3

SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES*
AGRICULTURE AND NATURAL RESOURCES
FY 1967 – 1973



*THE PRODUCTIVITY CHANGE BY ORGANIZATIONAL ELEMENT SHOWN HERE AND IN SUBSEQUENT CHAPTERS REPRESENTS DATA SUBMITTED BY THE INDIVIDUAL ELEMENTS. SOME ELEMENTS WERE UNABLE TO SUBMIT DATA FOR ALL YEARS.

An analysis of changes in constant dollar unit costs shows about the same picture as the productivity trend data. Through FY 1970 constant dollar unit costs remained about level. In FY 1971-1973 these costs decreased over 15 percent. A table showing the 6 year comparison between current and constant dollars is shown in Exhibit 3-4.

EXHIBIT 3-4

UNIT LABOR COST INDEXES

AGRICULTURE AND NATURAL RESOURCES

	FY 1967	1968	1969	1970	1971	1972	1973
Current	$100.0	104.8	113.2	127.8	132.4	134.7	138.4
Constant	$100.0	98.9	98.0	99.2	92.6	86.6	84.1

ANALYSIS OF CAUSAL FACTORS

Capital investment and automation were given as the major reasons for productivity gains by the organizations in this functional area. Some of the specific items mentioned were:

--Use of laser equipment by the Forest Service in making land surveys.

--Acquisition of automatic fish feeding devices, automatic egg sorters, and fish pumps.

--Use to computers to facilitate road design efforts.

--Use of automatic telemetry measurements of snow pack and water yields.

--Acquisition of automated gas separation and production facilities for helium manufacture.

Another item mentioned as contributing to productivity gains was:

A 5-year study of forest districts which led to numerous reductions, boundary changes, and consolidations.

An increase in work content caused by impacts of more stringent environmental standards and procedures was mentioned as the major obstacle to productivity improvement. The impact of this obstacle should be adjusted for in computing productivity, however, data was not available to do so.

PREDICTION OF FUTURE TREND

Most of the organizational elements felt that future productivity trends would be stable or downward due to increases in work content and decreases in visitor demand for use caused by shortages of fuel. Two elements citing increases felt that such would be caused by further capital investment for automation and mechanization.

NEXT STEPS FOR IMPROVEMENT

Good potential for expansion of the data base of this functional category exists. Large elements within the Agriculture and Interior Departments have good coverage potential. Work will continue during the next year to bring these elements into the data base.

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PRODUCTIVITY TREND-CITIZENS RECORDS

NATURE AND SCOPE

This functional area includes those activities which for the most part deal directly with the public in a service capacity. Its major components are the Social Security Administration and the Internal Revenue Service. It also includes the criminal records segment of the Federal Bureau of Investigation and the veterans service organizations of the Veterans Administration. The common thread which identifies elements of this function is that they are mainly paperwork-processing activities for the general public.

The function is comprised of 14 organizational elements from 8 agencies. These elements, which total over 160,000 FY 1973 man-years, are measured through 69 outputs products. A list of the participating organizations and degree of coverage is shown in Exhibit 4-1.

EXHIBIT 4-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and elements	FY 1973 man-years	Number of output	Output example
Commerce:			
Personal Census Service Branch	163	1	Cases completed
Health, Education and Welfare:			
Social Security Administration	58,222	22	Retirement claims processed
Justice:			
Federal Bureau of Investigation			
Crime and Science Laboratory	382	1	Evidence examinations made
Identification by Fingerprints	3,285	5	Fingerprint searches made
Maintenance of Investigation Records	1,404	7	Name searches made
Immigration and Naturalization	7,457	7	Inspections completed
Railroad Retirement Board:			
Entire Agency	1,771	4	Retiree accounts maintained
Selective Service System:			
Entire Agency	6,349	1	Registrants processed
State:			
Secular and Consular Affairs	2,097	3	Passports issued
Treasury:			
Bureau of Public Debt -			
Other Treasury Securities	569	3	Securities issued
Savings Bonds and Notes	904	3	Securities issued
Internal Revenue Service[1]	59,844	1	Weighted output composite
Veterans Administration:[2]			
Veterans Appeals	310	1	Appellate decisions
Veterans Benefits	17,986	10	Education applications processed
Total	160,743	69	

[1]Merged into a single element from 5 elements in last year's data base.

[2]Shifted to this function from educational assistance.

PRODUCTIVITY TREND

Productivity for this function reflects steady growth since FY 1968. After remaining stable during FY 1968 productivity climbed to 120.0 in FY 1973. Output has increased steadily since FY 1967. It jumped by about 10 percent in FY 1973 to a high of 131.8. Input rose in steps of about 4 percent in FY 1968, 2 percent in FY 1971, and 4 percent in FY 1973.

The productivity increase for this function represents a significant 3.1 percent average annual rate of growth. This growth was achieved by holding the input rise to 10 percent in the face of an output gain of over 30 percent. Most element representatives commenting on productivity gains cited automation as the major reason. The output, input and productivity trends are shown in Exhibit 4-2.

EXHIBIT 4-2

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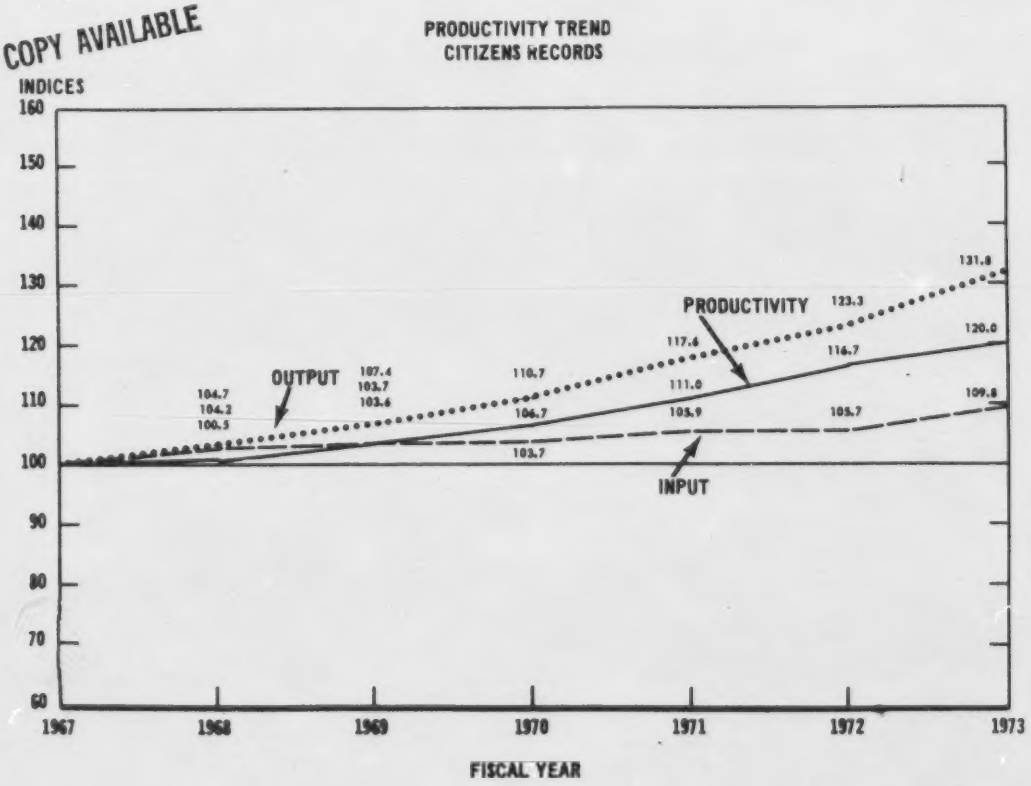
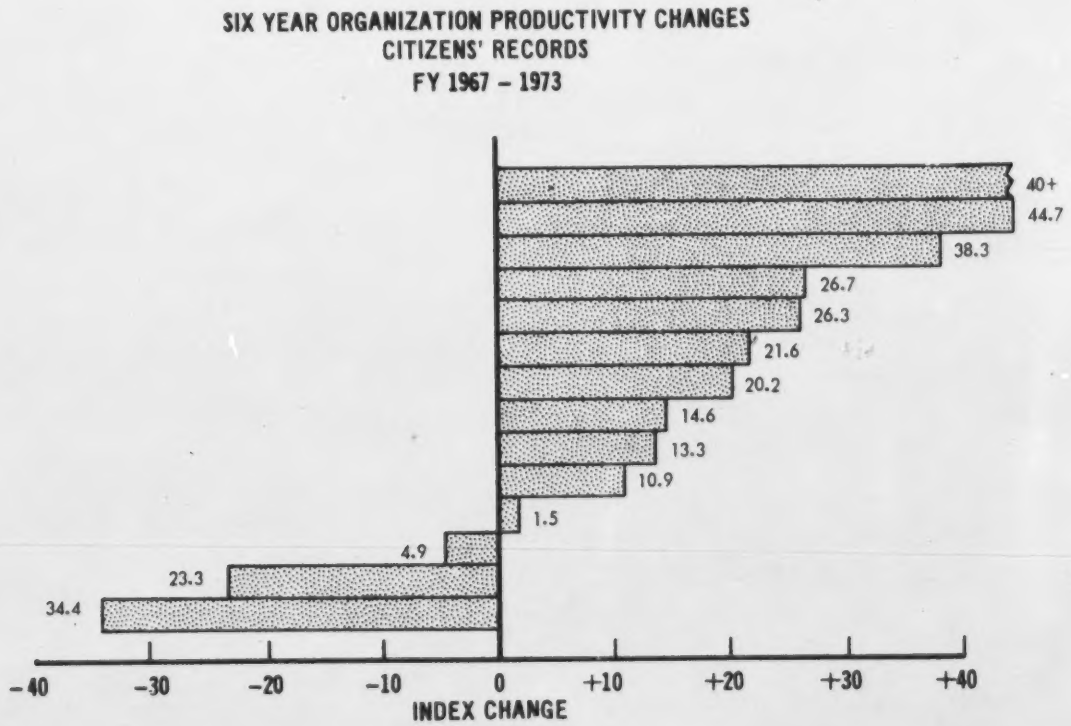


Eleven of the 14 organizational elements showed producivity increases, while three showed declines. Seven of the elements experienced gains in excess of 20 percent. Five achieved these gains by processing large increases in workload with small manpower increases, made possible through acquisition of better and faster equipment. A distribution showing FY 1973 productivity for each element is shown in Exhibit 4-3.

EXHIBIT 4-3



The one element which experienced a 35 percent decline over the six year period cited two reasons as follows:

(1) decline in output quantity which could not be matched with manpower decreases

(2) elimination of one type of output without eliminating the work associated with producing it.

Productivity gains in terms of increased equivalent output represents $340 million in labor cost over the 6-year period. This savings is also reflected in the decrease in constant dollar unit costs shown by the index in Exhibit 4-4.

EXHIBIT 4-4

UNIT LABOR COST INDEXES - CITIZENS RECORDS

	FY 1967	1968	1969	1970	1971	1972	1973
Current	$100.0	103.0	107.6	119.9	124.3	127.1	126.4
Constant	$100.0	97.2	93.2	93.2	86.9	81.7	76.8

ANALYSIS OF CAUSAL FACTORS

Productivity gains in this functional area have resulted mostly from automation.

Mechanized data processing, through ever-increasing sophistication, has become the lifeline of these organizational elements. Most of the elements are required to process large volumes of repetitive transactions, a condition ideal for mechanization.

The Department of Veterans Benefits of the Veterans Administration has achieved significant productivity gains in its field stations through centralization of clerical support into word processing centers. These centers, called Centralized Transcription Activities have reduced operating costs an average of 25 percent. Further productivity gains will occur as the new fully integrated continuous flow dictation systems recently installed in some field stations are installed in the remaining stations.

In addition the department has been acquiring automatic typewriters which have boosted productivity of clerical personnel from an average of 500 lines per day per typist to an average of over 1,000 lines per day per typist for many of the field installations.

The following specific examples were cited by other agency representatives as reasons for productivity gains.

--Purchase of $500,000 of computer equipment allowed an organization to process significant volume increase without increase in man-years.

--Use of optical character readers.

--Elimination of key punching by installation of key-to-tape and key-to-disc equipment.

--Automation of record file reduced man-years from 100 to 64.

--Direct data input by telecommunications system.

--Use of microfilm records.

--Savings of 3,179 man-years in one activity can be tied directly to automation over a 6-year period.

In addition to automation, a number of organizations took management actions which resulted in productivity gains. Savings of 9,683 man-years over the 6-year period resulted from management actions in one agency. Other causes cited were:

--Extensive overhaul and simplification of regulations, forms, and reports.

--Centralization caused closing of one office, resulting in savings of 125 man-years.

--Use of data generated by another agency avoided manual search for 40,000 addresses.

--Reduction in sample sizes and coding requirements for statistical data in the Social Security Administration.

--Establishment of teleservice centers for dealing with the public reduces the number of personal interviews required.

--Increase in amount of input data being received in machine readable form in accounting for savings bonds issued.

A number of obstacles to productivity improvement were cited, but perhaps the biggest problem was increase in the

effort required to produce the same product in the latter years. Other problems cited were:

--High turnover rates of 15-20 percent.

--Lag in automation has resulted in a number of menial boring jobs which are hard to staff.

--Constant retraining problems.

--Budgetary limitations and personnel ceilings.

PREDICTION OF FUTURE TREND

Most organizations forsee a continuation of the upward productivity trend due to the following:

--Further automation.

--Initial mechanization of some functions.

--Increase in training.

--Streamlining of processing procedures.

--Further simplication and automation of input data.

--Consolidation of some physical facilities.

NEXT STEPS FOR IMPROVEMENT

Some improvement is needed in measures presently used by some of the organizational elements because of changes in workload complexity. This problem will receive attention during the next year's effort. Attention will also be given to expanding coverage.

CHAPTER 5

PRODUCTIVITY TREND-TRAINING AND EDUCATION

NATURE AND SCOPE

This function includes organizational elements engaged directly or indirectly in furnishing educational assistance, primarily to disadvantaged segments of the general population. The function includes direct education of Indians and military dependents overseas, and educational assistance.

The functional category includes five organizational elements from five agencies. Almost 32,000 man-years are measured through 25 output products. Specific elements included in the data base are shown in Exhibit 5-1.

EXHIBIT 5-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Defense:			
Overseas Education of Dependents	8,840	1	Average membership
Office of Economic Opportunity:			
Entire Agency	2,119	1	Grant actions processed
Health, Education, and Welfare:			
National Institutes of Health-Health Manpower Education	827	3	Students supported
Interior:			
Bureau of Indian Affairs	17,361	19	Students enrolled
Labor:			
Manpower Administration	2,771	1	Weighted output composites
Total	31,918[1]	25	

[1]Shifted Veterans Benefits and Veterans Appeals elements which were reclassified to Citizens Records function.

PRODUCTIVITY TREND

Productivity for this function has remained relatively flat over the six year period. Increases in output have been matched by increases in input in most of the six years. As of the end of FY 1973, output had gained 16.0 percent over the base year level while input had gained 14.7 percent. Organizational element representatives felt the labor intensive nature of this function made productivity improvement difficult. On an average annual basis, the FY 1973 productivity index represents a .2 percent average annual gain from year to year. Input, output and productivity indexes for the six year period are shown below in Exhibit 5-2.

EXHIBIT 5-2

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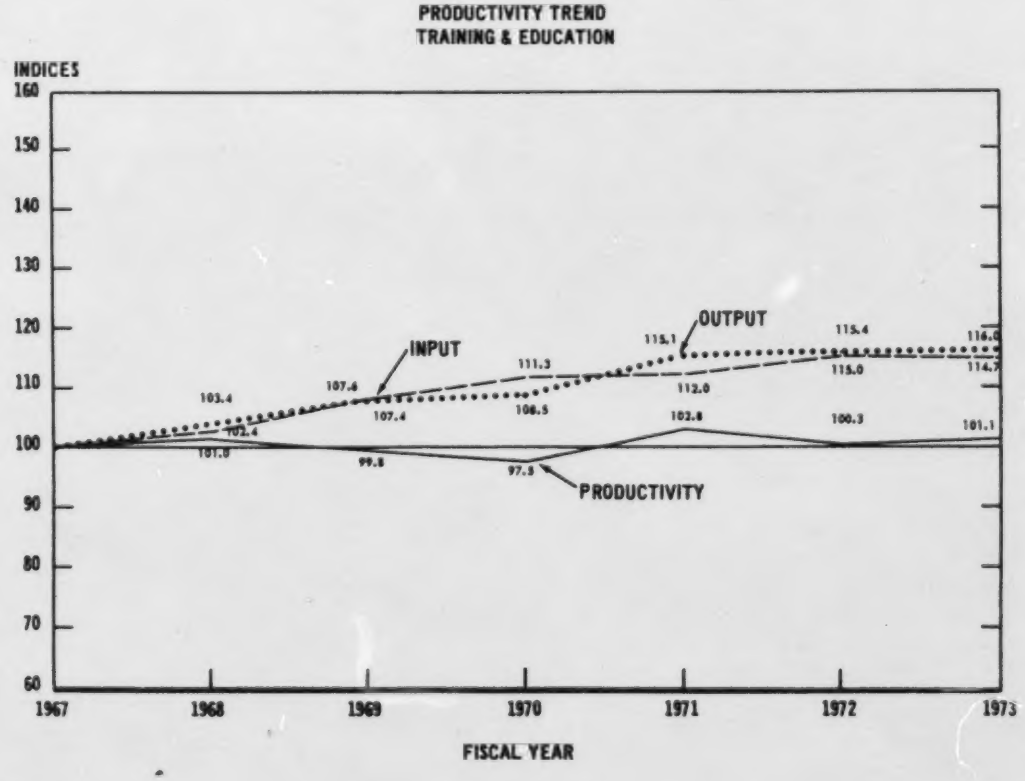
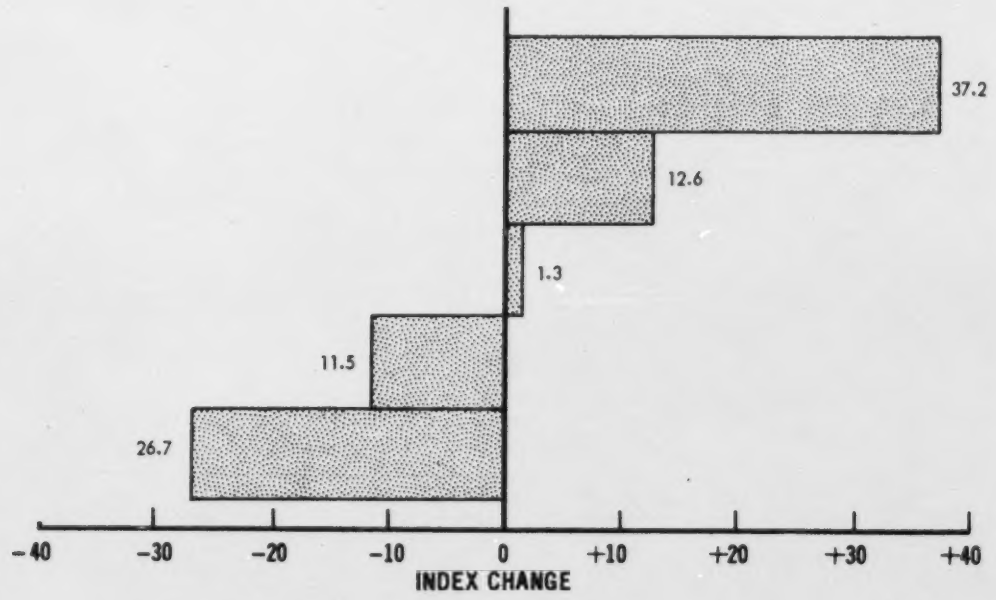


Productivity for two of the five organizational elements showed increases, one element remained about stable, and two showed significant decreases over the six year period. Four of the five organizational elements experienced large gains in output, but in one case there was an even larger gain in input. Productivity changes for the individual elements are shown in Exhibit 5-3.

EXHIBIT 5-3

SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES
TRAINING AND EDUCATION
FY 1967 - 1973



An analysis of changes in unit labor costs reflects a slightly brighter picture than the man-year productivity. Productivity based on labor costs gained about 5.7 percent over the period, therefore, constant dollar unit costs showed a decline as shown in Exhibit 5-4.

EXHIBIT 5-4

UNIT LABOR COST INDEXES-EDUCATIONAL ASSISTANCE

	FY 1967	1968	1968	1970	1971	1972	1973
Current $	100.0	105.0	113.1	129.7	135.2	147.4	155.7
Constant $	100.0	99.8	97.9	100.7	94.5	94.7	94.6

ANALYSIS OF CAUSAL FACTORS

Reorganization and restructuring of work were cited as the major items which have contributed to productivity gains. In addition, one organization cited centralization of facilities and automation and another cited intensification of training given to employees.

The major obstacles to productivity improvement were cited as increases in workload complexities and personnel problems. The following items were mentioned:

--Greater product complexities.

--An increase in the number of steps required to produce a product.

--High personnel turnover and low morale due to uncertainties from reorganization.

--Personnel ceilings and promotion freezes.

PREDICTION OF FUTURE TREND

Most organizational elements within this function predict slight productivity increases due to such factors as:

--Continuing management reviews.

--Computerization.

--Increases in training and orientation.

NEXT STEPS FOR IMPROVEMENT

Considerable work remains to be done with a number of organizational elements in the data base to consider alternate measures or otherwise adjust for change in complexity caused by elongation of processes. Expansion of the data base may be possible as a number of activities not presently in the data base are engaged in making educational grants.

CHAPTER 6

PRODUCTIVITY TREND-MEDICAL SERVICES

NATURE AND SCOPE

This function includes medical care provided directly by the Federal government through government-owned facilities. Such services are limited almost exclusively to military personnel, veterans, and the Indian population.

The function is comprised of 6 organizational elements within the Department of Defense, the Veterans Administration, and the Department of Health, Education and Welfare. There are 25 output products. While over 282,000 man-years are involved, about 80,000 are military personnel and only the 202,000 civilian man-years are reported here. The data base showing FY 1973 civilian man-years by element is shown in Exhibit 6-1.

EXHIBIT 6-1

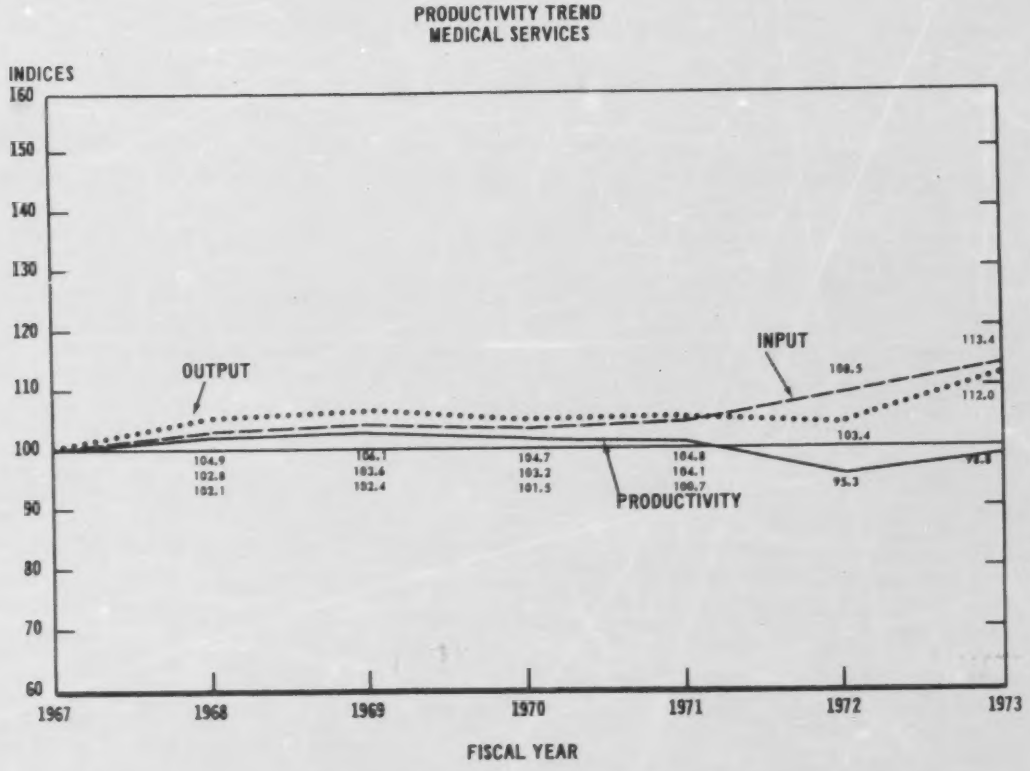
PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Defense:			
Army:			
Patient Care	21,070	1	Health care composite unit
Navy:			
Medicine and Surgery	1,291	3	Medical care composite unit
Air Force Hospitals	6,485	1	Adjusted admissions equivalent
Health, Education and Welfare:			
Federal Health Program Service	5,702	2	Inpatient days
Indian Health Service	7,378	10	Discharges
Veterans Administration:			
Medicine and Surgery	160,425	8	
Total	202,351	25	

PRODUCTIVITY TREND

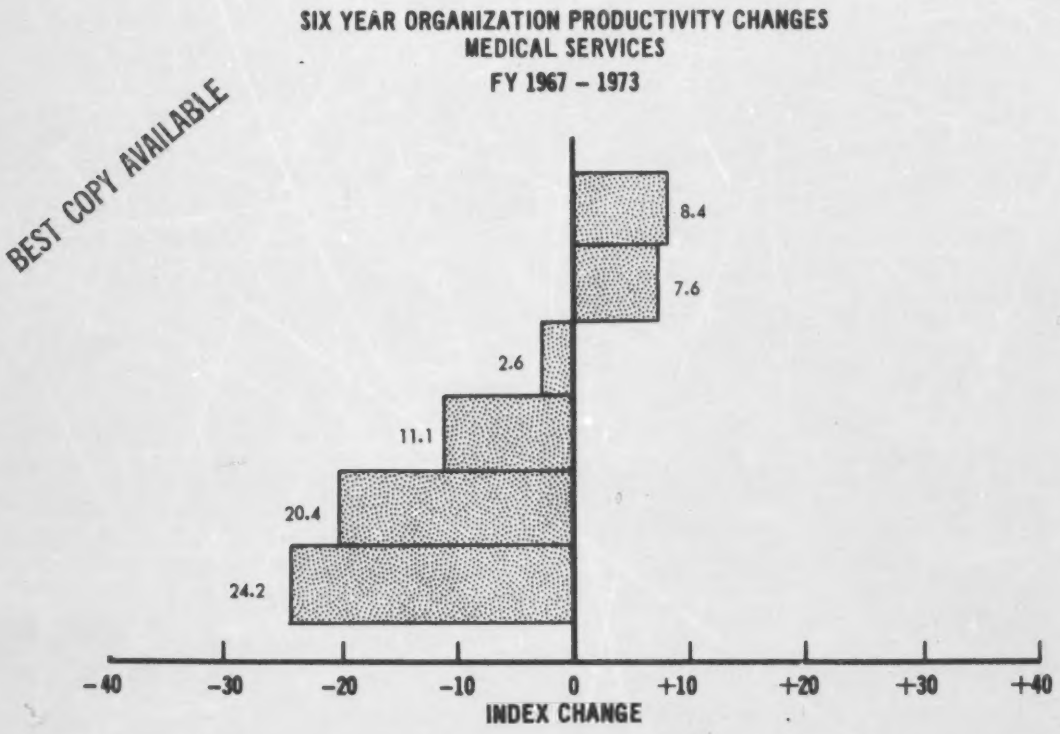
This function is one of two which has experienced productivity declines over the 6-year period. The productivity rose slightly in FY 1968 and FY 1969 as output increases outpaced man-year increases. However, the situation reversed during the remaining 4 years and productivity declined. Productivity reached a low point of 95.3 in FY 1972 but rose to 98.8 in FY 1973 because of a sharp increase in output. The sharp increase in FY 1973 resulted from an adjustment to properly reflect proper weighting of the effort in performing hemodialysis. The growth in manpower input over the least two years reflects an increase in speciality services and staffing for new hositals. The graph in Exhibit 6-2 shows these trends.

EXHIBIT 6-2



Over the 6-year period, four of the individual elements showed productivity declines, while two showed increases. Two of the four elements showing declines experienced output decreases coupled with input increases. The two elements showing productivity gains had increases in output. The distribution of elements is shown in Exhibit 6-3.

EXHIBIT 6-3



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In addition to computing productivity indexes based on man-years, an index was computed based on labor cost as an input. To do this a government wage deflator was applied to cost data furnished by the agencies.

Productivity indexes based on deflated labor cost are higher than the indexes based on man-years. A comparison of the two is shown in Exhibit 6-4.

EXHIBIT 6-4

MAN-YEAR AND LABOR COST INDEXES

Productivity	FY 1967	1968	1969	1970	1971	1972	1973
Man-Year	100.0	102.1	102.4	101.5	100.7	95.3	98.8
Labor Cost	100.0	103.1	107.6	104.5	105.5	99.2	103.1

This difference was attributed mainly to reduction in average grade by recruitment or replacement at lower grades and delays in ingrade increases. This element includes a large number of military personnel but that fact has had no measurable impact on this difference. The labor cost productivity is also reflected in the constant dollar unit cost. A table comparing current and constant dollar unit cost is shown in Exhibit 6-5.

EXHIBIT 6-5

UNIT LABOR COST INDEXES - HOSPITAL SERVICES

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	102.8	107.3	120.2	131.1	151.7	154.3
Constant $	100.0	97.0	93.3	93.4	91.7	97.5	93.7

ANALYSIS OF CAUSAL FACTORS

Capital investments and automation were given as primary reasons for productivity gains. In most cases the capital investments have been made but the gains have not yet been realized. The following capital investment items were cited:

--Modernization and renovation of facilities.

--Acquisition of automated diagnostic equipment.

--Conversion to automatic boilers and elevators.

--Use of waste compactors, heated food carts, and automated pill counting machines.

--The Veterans Administration, Bureau of Medicine and Surgery cited a recurring annual savings of over $56,000 through investment of $266,000 in new more modern laundry equipment by combining the laundry facilities of the New Orleans and Biloxi, Mississippi hospitals at the Biloxi site. In addition to the recurring savings of 7 man-years valued at $56,000 this consolidation resulted in a one time cost avoidance of $450,000 by obviating the need for replacement of laundry equipment at the New Orleans facility .

Other actions which have had a favorable impact on productivity were the following:

--Reorganization of one function reduced the number of man-years required by 221.

--Use of physician extenders who are specially trained to do the simple routine tasks formerly done by physicians.

Of greater impact than the actions which have resulted in gains are the items cited as obstacles to productivity improvement. The biggest obstacle mentioned was the failure to develop quantification of the significant increases in quality of service and complexity of service. In the medical care area the number of employees per patient has been steadily increasing as the quality of care improves but adjustments for this are difficult to identify; therefore, productivity tends to be understated. Other obstacles to productivity improvement were:

--Low morale caused by grade deescalations, freezes and reductions in force.

--Difficulty in obtaining capital investment funds to replace deterioating physical plant.

PREDICTION OF FUTURE TREND

A relatively stable productivity trend is predicted. A number of factors should contribute to productivity improvement, but their effect will probably be offset by the personnel increases required by new medical technology. Items which should contribute to improvement are:

--Military in service study on regionalization of military health services.

--Switch to contract provision of health care services where service through government facilities is uneconomical.

--Development of a comprehensive health care delivery system.

NEXT STEPS FOR IMPROVEMENT

A considerable effort is being expended by the Army and Air Force medical departments to develop measures of productivity which reflect the upgrading of quality.

CHAPTER 7

PRODUCTIVITY TREND-LOANS AND GRANTS

NATURE AND SCOPE

This functional category includes a variety of loans to citizens, businesses and institutions and insurance of loans to individuals, primarily on mortgages. It covers loans or grants made to individuals or institutions for scientific research. It also covers loans made to businesses through the Small Business Administration as well as loans to farmers through Farmers Home Administration.

The functional category covers over 33,000 man-years of effort measured through 77 output products. The category includes 11 elements from 8 agencies listed in Exhibit 7-1.

EXHIBIT 7-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Output	Output Example
Agriculture:			
Farmers Home Administration	8,672	1	Weighted work units
Agricultural Stabilization and Conservation Service - Field Operation	1,175	55	Invoices processed
Commerce:			
Economic Development - Pulbic Works	93	1	Grants approved
Farm Credit Administration:			
Examination Division	23	1	Examinations completed
Health, Education and Welfare:			
National Institutes of Health -			
Research Grants and Contracts	1,768	2	Applications reviewed
Mental Health Grants and Contract	4,484	2	Grant applications processed
Office of Education - Aid Programs	2,718	8	Loans awarded
Housing and Urban Development:			
Housing Production - Mortgage Credit	7,451	2	Mortgages examined
National Foundation on the Arts and Humanities:			
Entire Agency	280	1	Applications processed
National Science Foundation:			
Entire Agency	1,150	1	Proposals processed
Small Business Administration:			
Entire Agency	5,476	3	Loans approved
Total	33,290	77	

PRODUCTIVITY TREND

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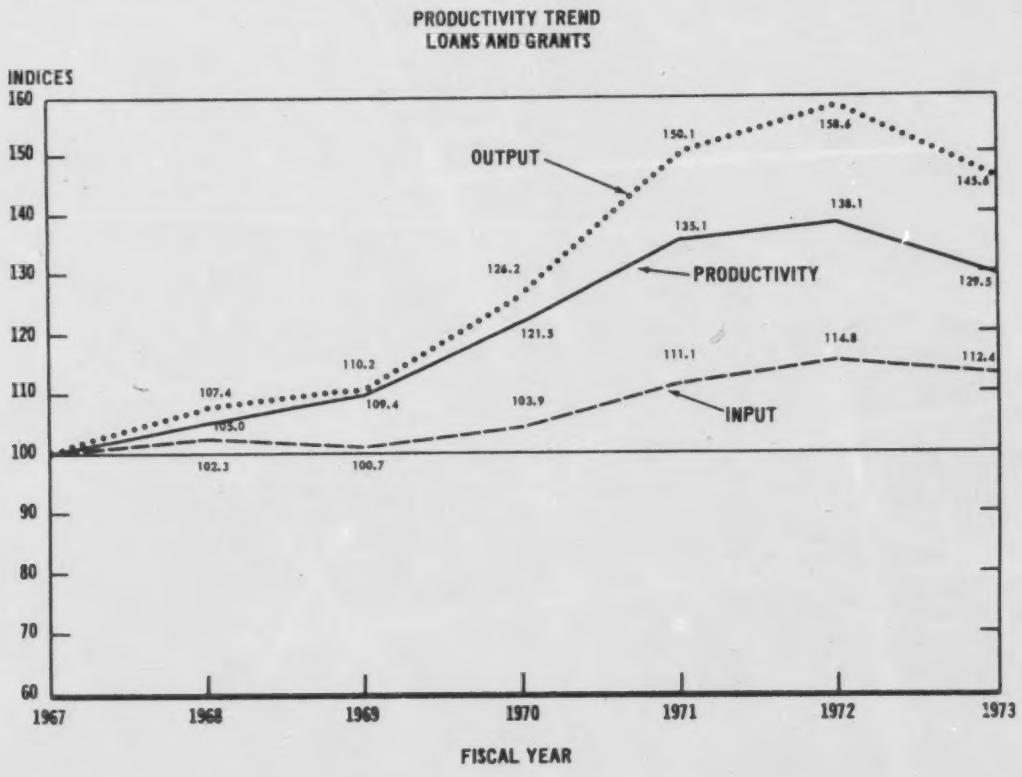
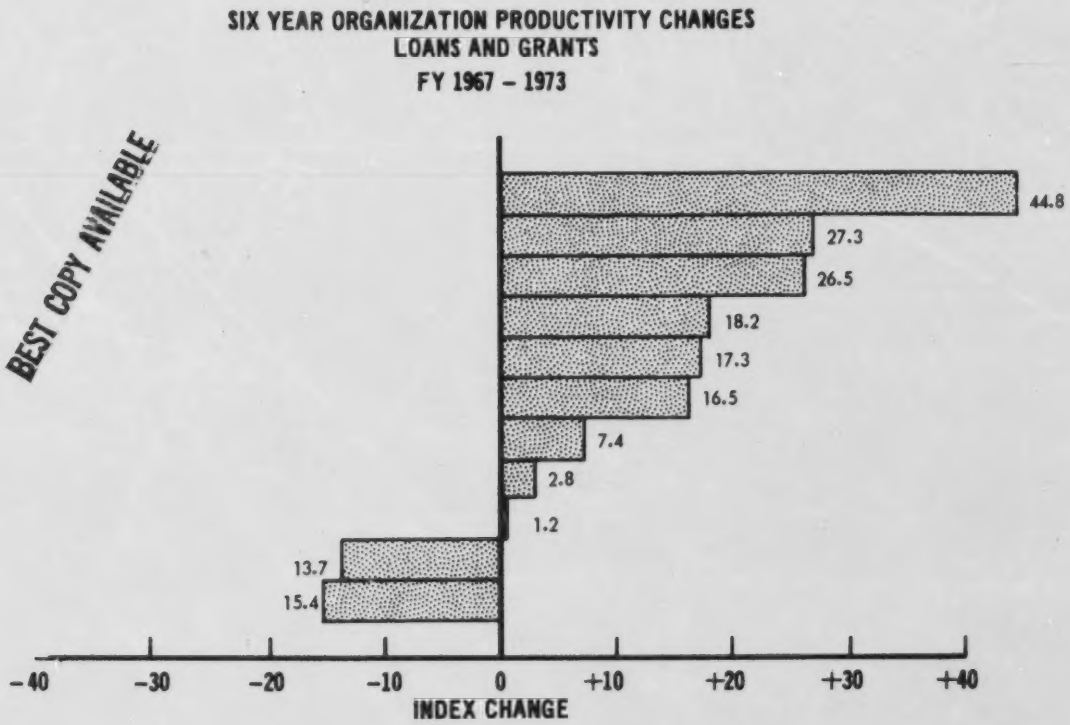
This function experienced large gains in output with smaller increases in input through FY 1972. This resulted in large productivity increases. The productivity index peaked in FY 1972 at 138.1, then decreased to 129.5 in FY 1973. Output and input also peaked in FY 1972 but output declined 13 points in FY 1973, compared to a 2 point drop in input. This was due to a significant drop in demand for loans caused by an economic downturn. The major portion of the productivity gain occurred in FY 1970 and 1971. During this period output rose 40 points, compared to only an 11 point rise in input. The six year productivity gain represents an average annual rate of 4.4 percent. These trends are shown in Exhibit 7-2.

EXHIBIT 7-2



Productivity indexes for nine of the eleven elements showed increases over the six year period. Three showed increases of less than 10 percent, three showed increases of 10-20 percent, two showed increases of 20-30 percent and one showed an increase of over 40 percent. A frequency distribution of elements is shown in Exhibit 7-3.

EXHIBIT 7-3



A different way of expressing productivity change is by analysis of changes in unit labor costs. The chart below shows unit labor costs for this function in both constant and current dollars. The current dollar costs showed an increase of about 23 percent but constant dollar unit costs dropped about 25 percent. Yearly indexes of constant and current dollar unit costs are shown in Exhibit 7-4.

EXHIBIT 7-4

UNIT LABOR COST INDEXES-LOANS AND GRANTS

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	102.6	105.6	108.2	104.9	108.5	122.7
Constant $	100.0	96.8	91.4	84.1	93.4	69.7	74.5

ANALYSIS OF CAUSAL FACTORS

Management actions in terms of work simplification and reorganizations were the keys to productivity improvement within this functional area. Some specific items mentioned were:

--Closer dependence on grant monitorship by trustee institutions reduces the effort required by the agency.

--Reorganization to concentrate people in specific programs will help to speed processing by specializing approval and monitorship efforts.

--Implementation of a production-line operation.

--Designation of specific individuals to receive and process applications assures greater consistency and speed in processing.

--Reorganization to simplify processing procedures.

--Establishment of a team concept improved employee involvement.

Other factors which caused productivity gains included capital investments. In one case a 50 percent savings in manpower was realized by installation of an automated cost analysis system. Other items which have caused productivity improvements include:

--Use of optical scanners to read input documents and thereby eliminate some keypunching.

--Establishment of a training center.

--Ongoing systems analysis.

--Initiation of borrower direct payment system, eliminating intermediate steps.

The major obstacles to productivity improvement were personnel related. Some examples were:

--High turnover caused by the need for employees to be in a travel status 100 percent of the time.

--Requirement to make managers out of scientists.

--Need for constant training because of an ever increasing workforce.

--High percentage of temporary positions.

--Turbulence created by changes in top management positions.

Other obstacles mentioned included increases in product complexity or a shift in product mix toward the more difficult item.

PREDICTION OF FUTURE TREND

No consensus was available relative to the trend of productivity in the near future. Three organizations felt the trend would be upward due to:

--More use of computer terminals with direct access to a centralized data center.

--Further simplification of operating procedures.

--Reversal of current economic condition.

Four organizations felt the trend would be stable or downward due to:

--Increased need for training.

--A major reorganization which will require reorientation.

NEXT STEPS FOR IMPROVEMENT

Some organizations in this category feel more attention must be given to obtaining better measures of output. In their view, the complexity changes which have occurred recently understate their productivity.

CHAPTER 8

PRODUCTIVITY TREND-POSTAL SERVICE

NATURE AND SCOPE

This functional category consists solely of the Postal Service whose function is to move the nation's mail. The following statement made by the Postmaster General in his FY 1973 annual report reflects the spirit and progress of the Postal Service:

> "The process of turning around an organization as vast and geographically dispersed as the postal system will require time. With two years of operation completed, the point has now been reached where past actions are beginning to show results. Improvement should become more visible from this point forward."

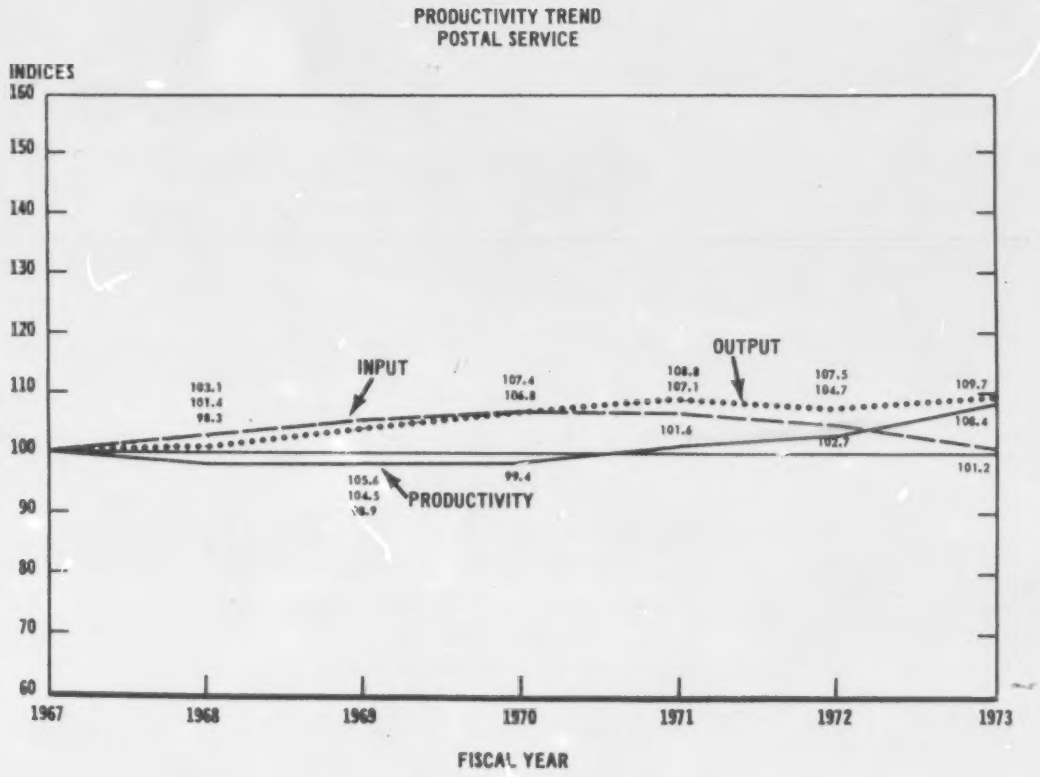
The data base for FY 1973 consists of 684,192 man-years. The output measure which was used to develop the indexes for the FY 1967-1973 period is the weighted output of 12 types of mail and six service categories. This method developed by BLS, replaces the one used last year in computing FY 1967-1972 productivity data (FY 1967=100) which used a single output measure of total pieces of mail handled. The new method takes into account the impact of changes in product mix. However, additional information on such factors as quality changes in mail services would provide further improvement in the measures of Postal Service productivity.

The current method results in showing lower productivity gains through FY 1972 than those shown in last year's report.

PRODUCTIVITY TREND

Regardless of the computation method, the Postal Service, as the Postmaster General has stated, has made a significant improvement in productivity. Using the current weighted output method, the productivity gains were 5.6 percent from FY 1972 to FY 1973 and 8.4 percent for the six year period. The average annual productivity increase for the six years ending FY 1973 was 1.4 percent. The six year trend of output, input and productivity is shown in the chart below, Exhibit 8-1.

EXHIBIT 8-1



An analysis of productivity change using dollars as the input measure was made. The impact and comparison of unit labor costs between current and constant dollars was developed and is shown in the table below, Exhibit 8-2.

EXHIBIT 8-2

UNIT LABOR COST OF THE POSTAL SERVICE

	FY 1967	1968	1969	1970	1971	1972	1973
Current	$100.0	106.7	113.9	123.1	138.0	147.0	148.7
Constant	$100.0	100.6	98.6	95.6	96.4	94.4	90.3

The table shows that the unit labor costs increased at an average annual rate of 6.8 percent. However, when the effect of inflation is factored out, the Postal Service shows a decrease in cumulative unit labor cost of 9.7 percent for the six year period ending in FY 1973.

ANALYSIS OF CAUSAL FACTORS

"Progress toward better postal service was made on two levels in FY 1973. First, the service worked to serve immediate needs to move 89.7 billion pieces of mail efficiently to their destination on a day to day basis. Second, and simultaneously, it worked to effect modernizing changes to insure the mail system will live up to the increasing demands of coming decades." This statement appearing in the Postmaster General's annual report states generally the key causal factors which yielded the high productivity gains described previously.

Some specific examples of increased efficiency of operations are as follows.

--New methods of handling bulk mail are being introduced which will eventually do away with 80 percent of the manual handling of this type of mail.

--Cluster mail boxes have been instituted in planned communities and new towns. These provide centralized mail delivery for up to 18 families in each unit.

--A new collective bargaining agreement will provide constructive approaches for settling grievences sooner and in a more cooperative manner.

--A series of management conferences were held for the purpose of analyzing service problems and identifying ways for correcting them.

Although emphasis was placed on improving operational efficiency, significant improvements were made to provide better service to the public. Some of the actions being taken by Postal Service management are to:

--Negotiate with mail air carriers to reduce mishandling and erroneous dispatches and to improve protection of the mail.

--Work further towards improving timely delivery of the mail. Monitoring of progress is made through the Origin-Destination Information System.

--Pursue an aggressive program of research and development to improve existing service and provide new services to customers.

For example, bar-code reading equipment, developed for reading printed envelopes, will facilitate sorting with speed up to 42,000 pieces per hour.

Another example is the determination of customer postage costs by computer. Mailers feed into computers the number of items in the order package and the weight of packaged materials. The computer prints the postage cost on the package and at the same time addresses the shipping label.

--Establish new mail pickup procedures which give more time to customers on certain mailboxes. Mail would be collected at the close of business or even later for processing that same evening.

--Emphasize training because the results of several studies conducted by the Postal Service Training and Development Institute show a direct relationship between productivity and the amount of training received by employees.

Capital investment is a key for productivity growth and quality of service. The Postal Service in 1973 undertook the largest construction program in its history. A total of $950 million is being spent on the National Bulk Mail System. Aside from the quality improvement that the customers will gain, a savings of more than $300 million annually in postal operating costs is expected. Also during 1973, $45.1 million was committed for further mechanization in the sorting of mail. Each of 487 machines now in operation has facilitated the sorting of mail into bins. The new equipment has eliminated the need for postal clerks to memorize complex sorting schemes and increased the ability of management to change distribution patterns quickly. Approximately 44 percent of the letters are sorted mechanically.

One problem faced by the Postal Service this year was the significant reduction of the labor force which brought

about a reduction in the quality of service in certain areas of the country. This reduction was aimed at improving efficiency, but resulted in a sacrifice of service especially during the Christmas holiday period. Corrective actions have been taken to alleviate this problem.

FUTURE PREDICTION OF TREND

The Postal Service is continuing an aggressive program for improving facilities and procedures, and expects this to lead to further gains in productivity.

NEXT STEPS FOR IMPROVEMENT

The improvement of productivity measurement is evolutionary. The Postal Service is making a major effort to improve principal information systems and as part of this effort to develop an index that more fully reflects productivity changes.

CHAPTER 9

PRODUCTIVITY TREND-POWER

NATURE AND SCOPE

This function encompasses organizational elements engaged in producing, transmitting, and marketing electric power as well as research and development and power construction activities. It includes the Tennessee Valley Authority and four elements of the Department of the Interior. It measures over 27,000 man-years through 42 output products. Elements included are shown in Exhibit 9-1.

EXHIBIT 9-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

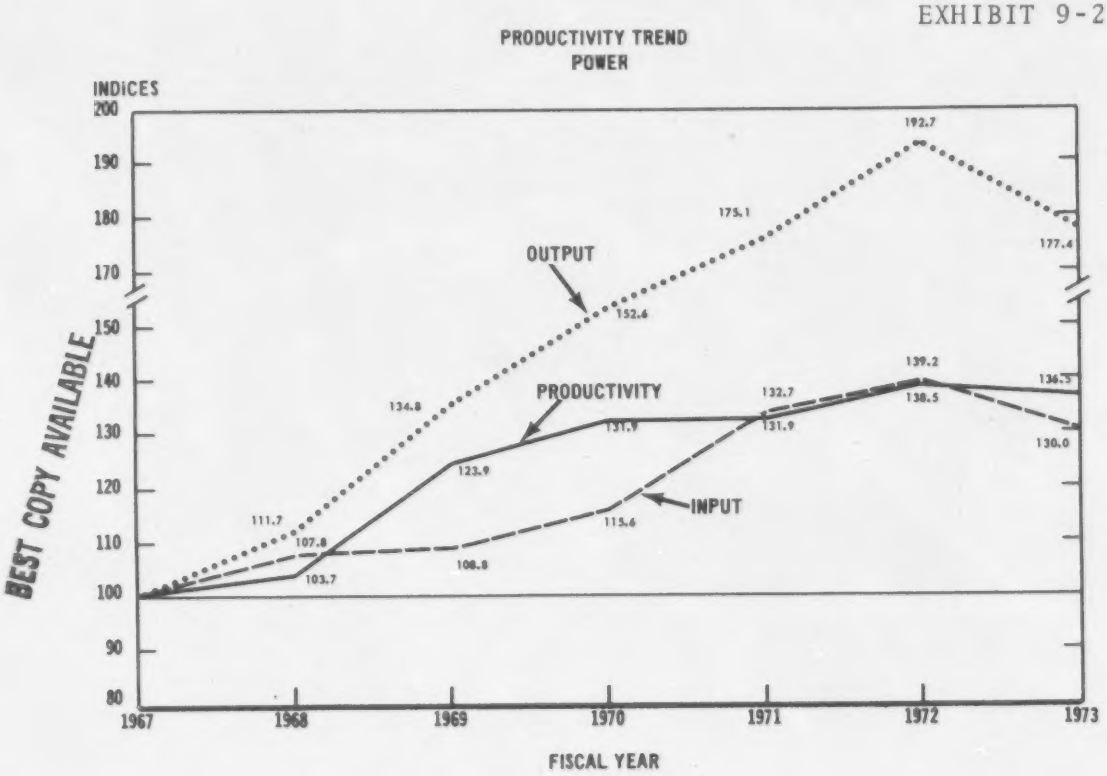
Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Interior:			
Bonneville Power	3,390	1	Kilowatt hours delivered
Southwestern Power	179	1	Transmission capacity installed
Southeastern Power	37	1	Megawatts sold
Alaska Power	33	1	Kilowatt hours generated
Tennessee Valley Authority:			
Overall Agency	24,043(1)	38	Miles of line constructed
Total	27,682	42	

[1]Non power production manyears is 16,660.

PRODUCTIVITY TREND

This function experienced large increases in output through FY 1972. In the period FY 1967-FY 1972 output increased over 90 percent. Input over the same period increased by only 39 percent; therefore, productivity gained over 38 percent. During FY 1973 output and input both dropped significantly and productivity decreased slightly from 138.5 to 136.5. The average annual rate of gain for the six year period FY 1967-FY 1973 was 5.3 percent. The trends are shown in Exhibit 9-2.

EXHIBIT 9-2



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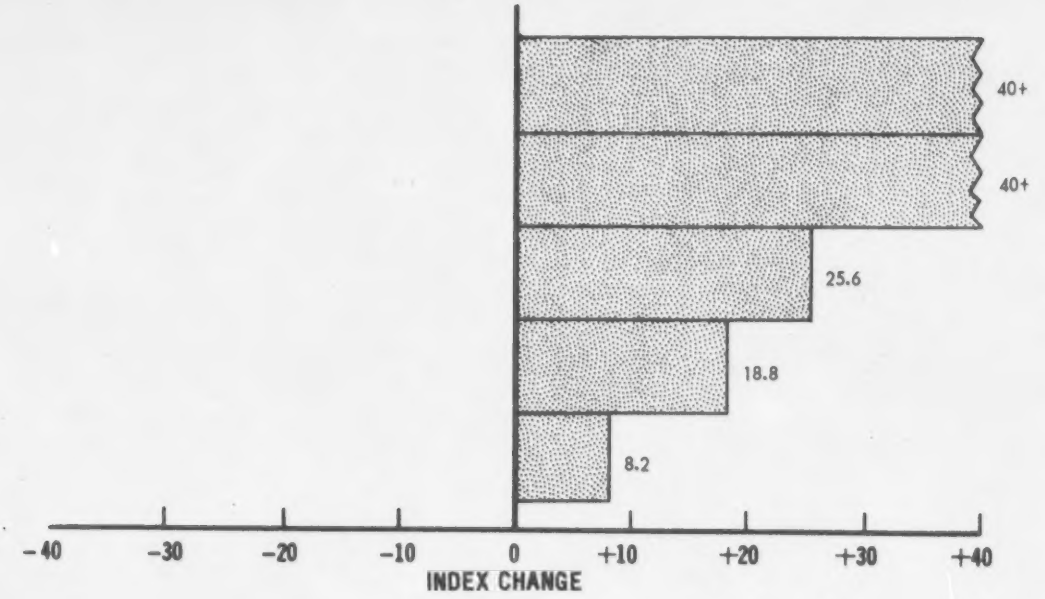
The productivity trends by organizational elements show gains over the six year period for all elements. These gains range from a low of 8 percent to a high of 77 percent. The high gains are caused by large increases in power production without comparable input increases. The gains for each element are shown in Exhibit 9-3.

SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES
POWER
FY 1967 – 1973

EXHIBIT 9-3



A review of the impact of productivity gains can be seen as reductions in constant dollar unit cost. The indexes of constant dollar unit costs for this function show the drastic reductions which have occurred. These indexes are shown in Exhibit 9-4.

EXHIBIT 9-4

UNIT LABOR COST INDEXES-POWER

	FY 1967	1968	1969	1970	1971	1972	1973
Current	$100.0	101.8	93.9	94.4	104.2	107.6	115.4
Constant	$100.0	96.0	81.3	73.3	72.9	69.2	70.1

To analyze the productivity trend for power production only non-power production operations were separated out of the data base. The indexes for power production are shown in Exhibit 9-5.

EXHIBIT 9-5

PRODUCTIVITY TREND-POWER PRODUCTION

	1967	1968	1969	1970	1971	1972	1973
Output Index	100.0	111.7	134.7	142.9	144.5	152.4	162.9
Input Index	100.0	107.8	108.8	110.6	116.5	118.4	122.0
Productivity Index	100.0	103.6	123.8	129.2	124.0	128.7	133.5

In terms of power production, productivity rises in FY 1973 while the overall function shows a turning around due primarily to a downturn in non-power production outputs. This downturn occurs mainly in the construction of new power facilities.

ANALYSIS OF CAUSAL FACTORS

Because power production and transmission are capital-intensive, the major part of productivity gain has been tied to capital investment and automation. Specific items mentioned by agency representatives include:

--Transmission system capability was increased by 70 percent by installing new dynamic breaking resistors.

--Automation of some operating and support functions.

--Automation of system control functions.

--Automation of billing and financial management functions.

Reorganization and simplification of billing procedures also contributed to productivity gains.

As obstacles to productivity improvement, agency representatives gave primary importance to the restrictions being imposed by the changes in environmental quality standards. Other obstacles mentioned included:

--Across the board limitations on employment, travel and overtime.

--High turnover due to the rash of first generation retirements for one element.

--Stringent labor contracts.

PREDICTION OF FUTURE TREND

Most agency representatives believe that the productivity trend will continue upward at a lower rate than in the past because of energy conservation measures and constantly more difficult environment standards. Productivity increases were predicted based on the following:

--New plants coming on line.

--Use of automated scheduling techniques for power production and distribution.

--Use of a manpower task force to study ways of improving productivity.

Chapter 10

PRODUCTIVITY TREND-REFERENCE SERVICES

NATURE AND SCOPE

This function includes libraries, statistical research type activities and document distribution centers. Employees covered are engaged in the primary library function of cataloging and indexing plus activities such as generating data for periodic reports and completing customer orders for specified documents.

The measured data base is comprised of nine elements from eight agencies. Over 7,700 man-years are measured through 25 output products. The data base is shown in Exhibit 10-1.

EXHIBIT 10-1

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PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

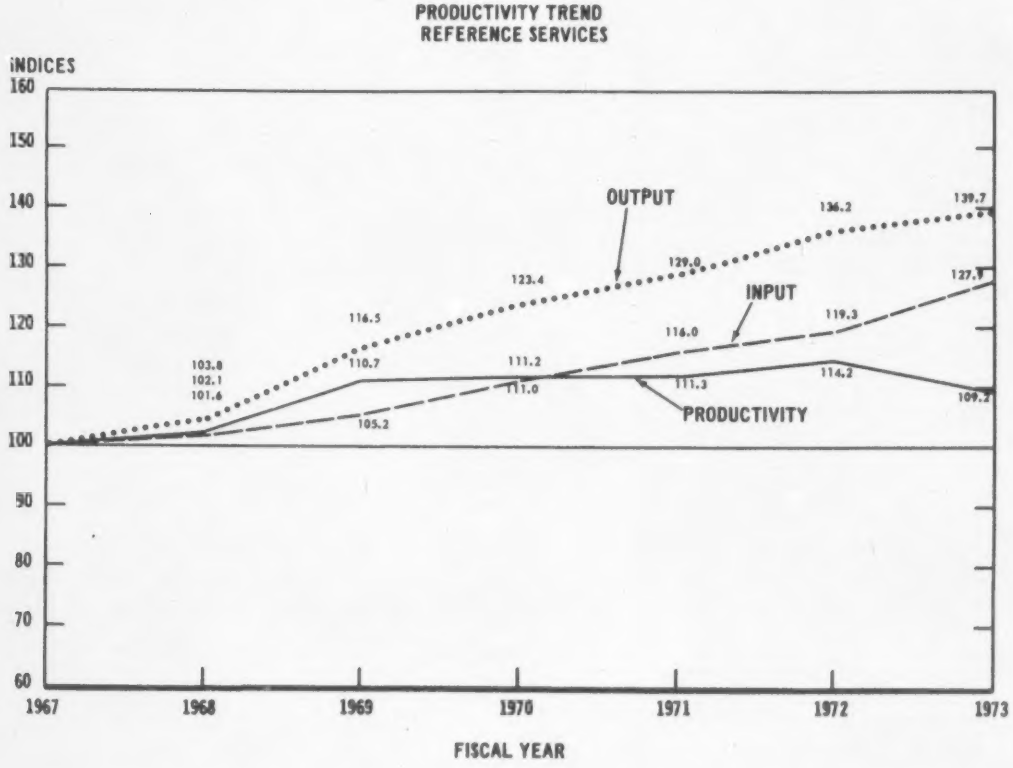
Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Agriculture:			
National Agricultural Library	195	4	Titles cataloged
Statistical Reporting Service	1,314	2	Reports released
Commerce:			
National Technical Information Service	233	1	Sales orders processed
General Services Administration:			
National Archives	2,185	4	Information services provided
Government Printing Office:			
Public Documents	1,402	4	Publications sold
Health, Education and Welfare:			
National Institutes of Health--Library of Medicine	133	3	Services performed
Labor:			
Bureau of Labor Statistics	1,781	1	Weighted measure
U.S. Information Agency:			
Broadcasting Services	296	1	Transmitter hours
Commission on Civil Rights:			
Entire Agency	190	5	Reports issued
Total	7,729	25	

PRODUCTIVITY TREND

This function has experienced large gains in output since FY 1967. At the end of FY 1973 output was about 40 percent above the FY 1967 level. Input has also risen significantly, thereby holding productivity gains down. Productivity peaked in FY 1972 at 114.2, then decreased to 109.2 in FY 1973. An output increase of about 3 index points was more than offset by a rise of 8 points in the man-year index, thereby causing the productivity decline. This man-year increase was caused by temporary staffing for a number of one time efforts which will simplify future output production, but did not contribute to output in FY 1973.

The FY 1973 productivity index of 109.0 represents an average annual rate of increase of 1.5 percent over the six year period. This experience was the result of a 40 percent gain in output coupled with a 28 percent increase in man-years. These trends are shown on Exhibit 10-2.

EXHIBIT 10-2



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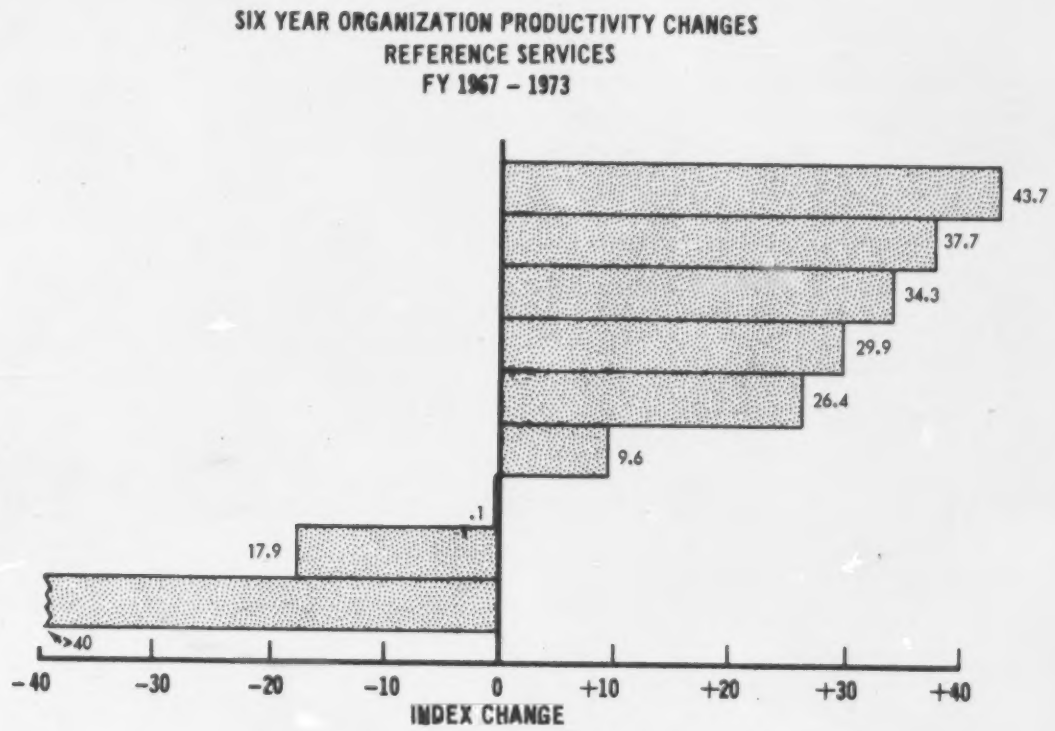
An analysis of productivity change by element shows six elements experiencing productivity increases, two experiencing declines and one remaining stable. In each of the six elements showing gains output increased significantly, while in both elements showing declines output decreased. The FY 1973 indexes for each element are shown on Exhibit 10-3.

EXHIBIT 10-3



One element had a drop of over 40 percent over the six year period which was due to a significant input increase to accomplish one time efforts which could not be separated out.

Agencies were requested to submit labor cost along with man-year data. The productivity index computed on deflated labor cost shows an increase of more than twice the rate shown for the six year period by the man-year index. A comparison of the two is shown in Exhibit 10-4.

EXHIBIT 10-4

MAN-YEAR AND LABOR COST
INDEXES-REFERENCE SERVICES

Productivity	FY 1967	1968	1969	1970	1971	1972	1973
Man-Year	100.0	102.1	110.7	111.2	111.3	114.2	109.2
Labor Cost	100.0	105.2	115.2	113.7	117.1	123.2	122.8

The differences between the two indexes are due primarily to reductions in average grade achieved during the last three years. On a deflated basis, this amounts to a lower cost per man-year. Another way of expressing the labor cost productivity is the constant dollar unit cost index. A table comparing constant and current dollar unit cost for the six year period is shown in Exhibit 10-5.

EXHIBIT 10-5

UNIT COST INDEX-REFERENCE SERVICES

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	100.8	100.3	111.2	122.1	126.3	134.0
Constant $	100.0	95.1	86.8	86.4	85.4	81.2	81.4

ANALYSIS OF CAUSAL FACTORS

Capital investment and automation have been responsible for most of the productivity gains experienced by these elements. Agency representatives cited the following as specific items which caused gains:

--Installation of a conveyor belt system for moving documents.

--Automation of the information service function at the National Archives.

--Computer automation of cataloging, indexing and bibliographic systems.

--Computerization of statistical data computations.

--Use of magnetic card typewriters.

Two of the elements achieved productivity gain by reorganizing their activities along functional lines. Other management actions which resulted in productivity gain were:

--Change in record storage layout.

--Rechanneling of work to avoid duplication.

The primary obstacles to productivity improvement cited were increases of effort to produce the product and encountering personnel problems. Although grade reductions have helped productivity based on labor dollars, this action has hurt morale, thereby making productivity increases more difficult. Other obstacles cited were:

--Freezes on employment.

--High turnover.

--Lack of capital investment funding:

.to obtain additional magnetic card equipment.

.to build a much needed new facility since the present facility restricts productivity improvement.

PREDICTION OF FUTURE TREND

Most agency representatives saw productivity gains in the near future due to the following:

--Installation of a new computer system to facilitate workload processing.

--Further capital investment in a computerized data base.

--Conversion of present microfiche cataloging system to visual display from on-line computer storage.

--Simplification and improvement of present methods and procedures.

--Construction of a new, more efficient facility.

--Reduction of original researching and cataloging through improved telecommunications and use of data available at other facilities.

NEXT STEPS FOR IMPROVEMENT

There is considerable potential for expansion of coverage among libraries. Only two of the many libraries which are part of the Federal government are now covered. Experimental efforts with the Federal Libraries Committee are underway and it is hoped that the coverage can be expanded for the next report.

Efforts will be devoted to refinement of some of the measures presently being used in research and periodic report-generating activities.

CHAPTER 11

PRODUCTIVITY TREND-REGULATION

NATURE AND SCOPE

This functional category contains a large number of organizational elements which have been grouped into the following subfunctional categories:

Rulemaking and Licensing
Manpower and Labor Relations
Finance
Inspection and Enforcement

The productivity for the overall function increased at an average annual rate of 3.5 percent. This was caused by an output gain of 40 percent compared to an input rise of 14 percent over the 6-year period. The productivity data for each one of these groups will be discussed separately.

RULEMAKING AND LICENSING

NATURE AND SCOPE

This subfunction includes those activities whose primary mission is to regulate specific industries by setting rules of conduct and issuing licenses to control citizens or businesses engaging in the function. Regulated industries include power, communications, commerce, and trade. The data base includes 16 organizational elements from nine agencies. It is comprised of over 8,900 man-years, measured through 84 output products. The subfunctional data base is shown in Exhibit 11-1.

EXHIBIT 11-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

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Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Civil Aeronautics Board:			
Audits, Reports, etc.	82	6	Consumer complaints processed
Commerce:			
Patent Office	2,828	2	Patent disposals
Environmental Protection Agency:			
Regulatory	693	4	Certificates issued
Federal Communications Commission:			
Safety and Special Services	116	10	Applications processed
Chief Engineer	146	4	Licenses approved
Field Engineer	430	2	Applications examined
Common Carrier	201	4	Radio applications reviewed
Federal Maritime Commission:			
Entire Agency	272	5	Agreements processed
Federal Power Commission:			
Entire Agency	854	21	License applications issued
Federal Trade Commission:			
Entire Agency	1,438	5	Formal investigations completed
Interior:			
Mining Enforcement and Safety Administration:			
Pittsburg	36	7	Flame tests given
Metal and non-metal	82	3	Spots investigations made
Interstate Commerce Commission:			
Compliance	609	3	Insurance certificates processed
Regulation of Carrier Rates	238	3	Financial analyses prepared
Supervision of Carrier Accounting and Statistics	723	3	Accounting examinations made
Supervision and Interpretation of Tariffs	202	2	Tariffs examined
Total	8,950	84	

PRODUCTIVITY TREND

Output for this subfunctional area grew to 125.6 in FY 1973 from the base of 100 in FY 1967. Input remained relatively stable through FY 1972, then jumped significantly in FY 1973 to 108.7. All elements experienced some input increase during FY 1973. The extent of the increase varied from less than one percent to over twenty percent. The primary reason for the increase was increased complexity of work content. Productivity followed output until FY 1972, then dropped sharply in FY 1973 because of the significant rise in input. Productivity peaked at 119.8 in FY 1972 before dropping in FY 1973 to 115.6. The average annual rate of productivity gain was 2.4 percent. The trends are shown in Exhibit 11-2.

EXHIBIT 11-2

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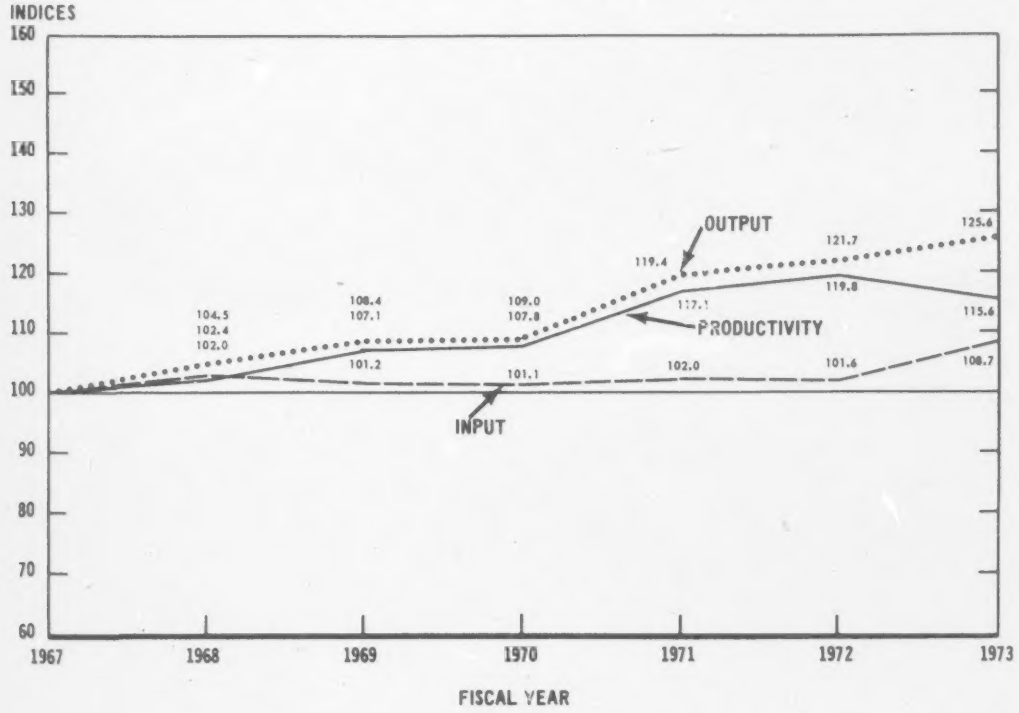
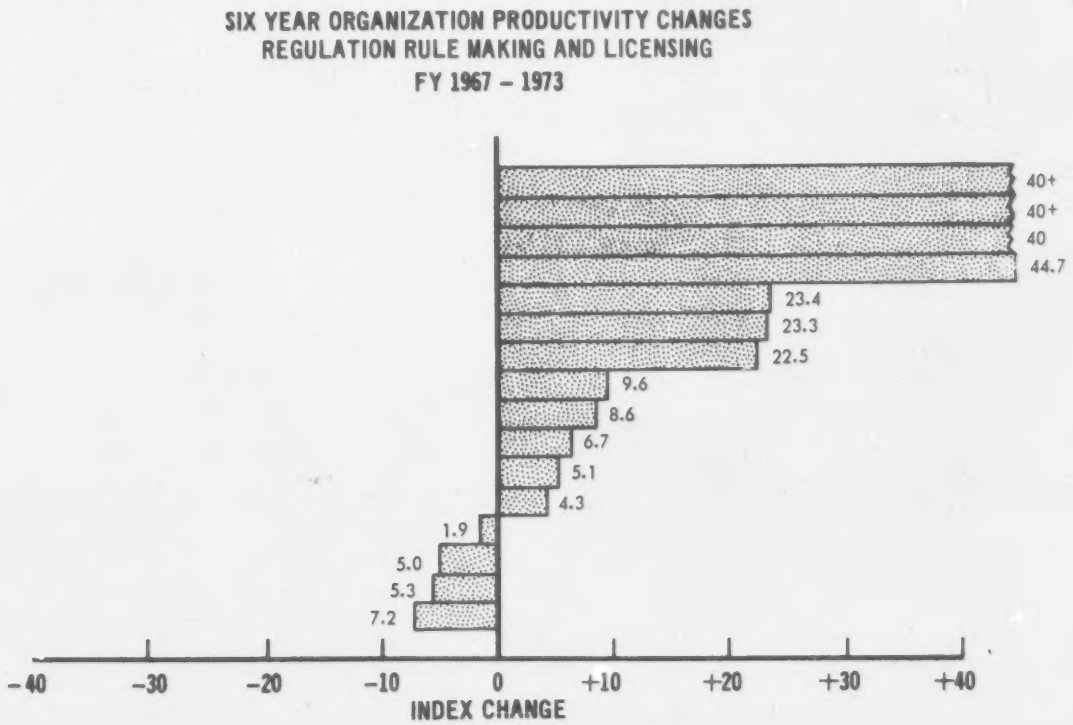
PRODUCTIVITY TREND
REGULATION – RULE MAKING AND LICENSING



Twelve of the 16 organizational elements showed productivity gains over the 6-year period. Five of these increased less than 10 percent, three increased between 20 and 30 percent, and four increased over 40 percent. All of the elements experiencing productivity gains also had increases in output, while three of the four elements showing declines in productivity had decreases in output. The FY 1973 productivity index for each of the 16 elements is shown in Exhibit 11-3.

EXHIBIT 11-3



MANPOWER AND LABOR RELATIONS

NATURE AND SCOPE

This subfunctional category encompasses those activities primarily involved with labor relations and mediation of labor disputes. It includes two major divisions of the Department of Labor as well as the National Labor Relations Board.

This subfunction covers over 6,800 man-years measured through five elements from four agencies as shown in Exhibit 11-4.

EXHIBIT 11-4

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Federal Mediation and Conciliation Service:			
Entire Agency	439	1	Cases closed
Housing and Urban Development:			
Equal Opportunity	436	2	Units examined
Labor:			
Employment Standards	2,364	1	Weighted investigations
Occupational Health	1,202	1	Inspections made
National Labor Relations Board:			
Entire Agency	2,388	4	Cases processed
Total	6,829	9	

PRODUCTIVITY TREND

Productivity jumped significantly in FY 1968 and FY 1969 based on FY 1967 as base year, rose gradually through FY 1971, then levelled off to 123.7 in FY 1973. The significant productivity gain in the first 2 years was caused by a 21 percent output increase coupled with only a 2 percent increase in man-years. Output and input declined in FY 1970, then both increased at about the same rate through FY 1973, causing productivity to remain stable. The 123.7 productivity index in FY 1973 represents an average annual gain of 3.6 percent. Exhibit 11-5 below shows these trends.

EXHIBIT 11-5

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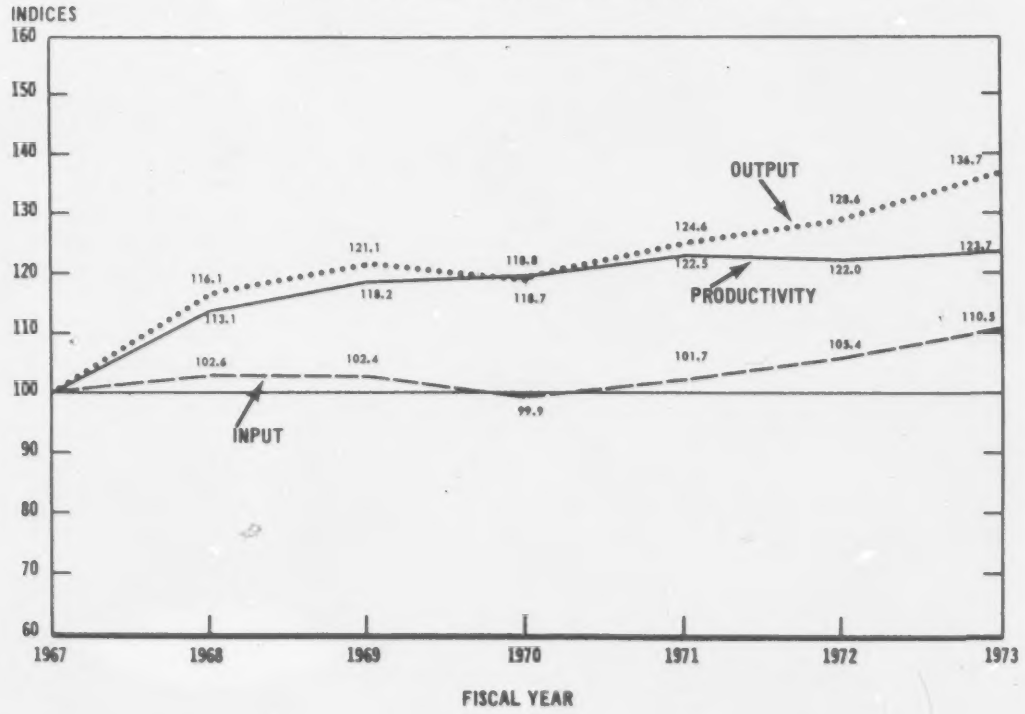
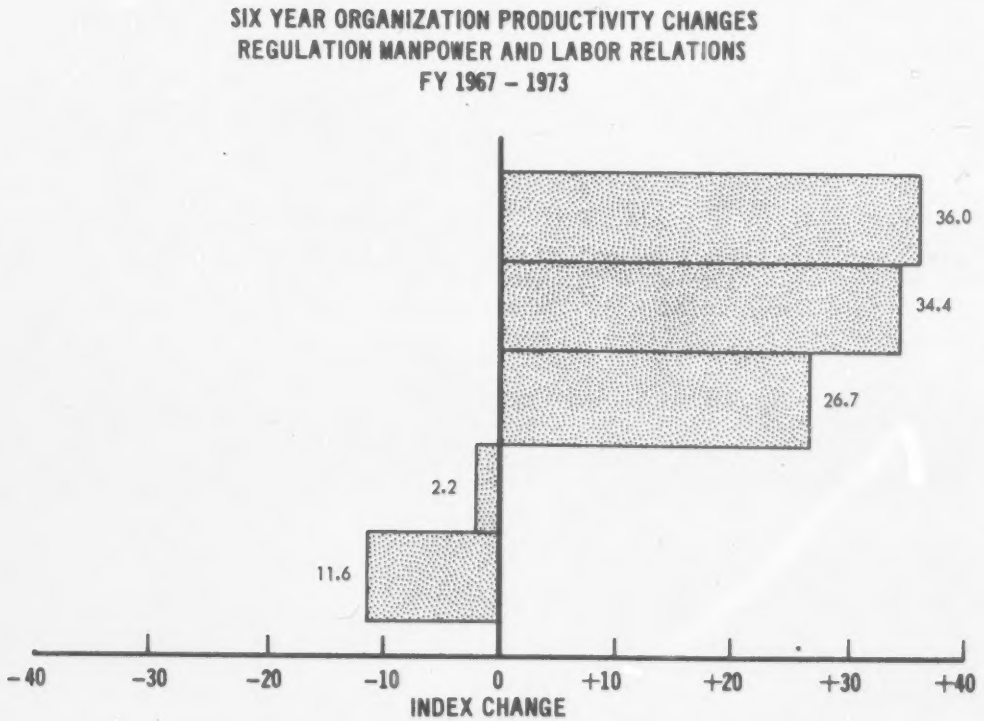
PRODUCTIVITY TREND
REGULATION – MANPOWER AND LABOR RELATIONS



Three of the five elements showed productivity gains while two showed declines. The 6 year change for each element is shown in Exhibit 11-6.

EXHIBIT 11-6



FINANCE

NATURE AND SCOPE

This subfunction includes those elements engaged in regulating financial activities. It includes government credit union and national bank audit activities. The subfunction covers six organizational elements from six agencies and covers over 5,800 FY 1973 man-years. The data base is shown in Exhibit 11-7.

EXHIBIT 11-7

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Federal Home Loan Bank Board:			
Entire Agency	1,117	5	Accounts insured
General Accounting Office:			
Transportation and Claims	508	1	Dollar value of overcharge
National Credit Union Administration:			
Entire Agency	351	1	Credit unions examined
Renegotiation Board:			
Entire Agency	217	10	Financial filings examined
Securities and Exchange Commission:			
Entire Agency	1,555	28	Registration statements examined
Treasury:			
Comptroller of the Currency	2,148	4	Trust departments examined
Total	5,896	49	

PRODUCTIVITY TREND

Productivity jumped 30 percent through FY 1970, then grew at a much more gradual rate to about 35 percent over the entire period - FY 1967-FY 1973. Output jumped over 33 percent through FY 1970, then increased at a more gradual rate through FY 1973. Input rose gradually to 108.8 in FY 1973. The FY 1973 productivity index of 134.6 represents an average annual gain of 5.1 percent. The 6 year productivity trends are shown in Exhibit 11-8.

EXHIBIT 11-8

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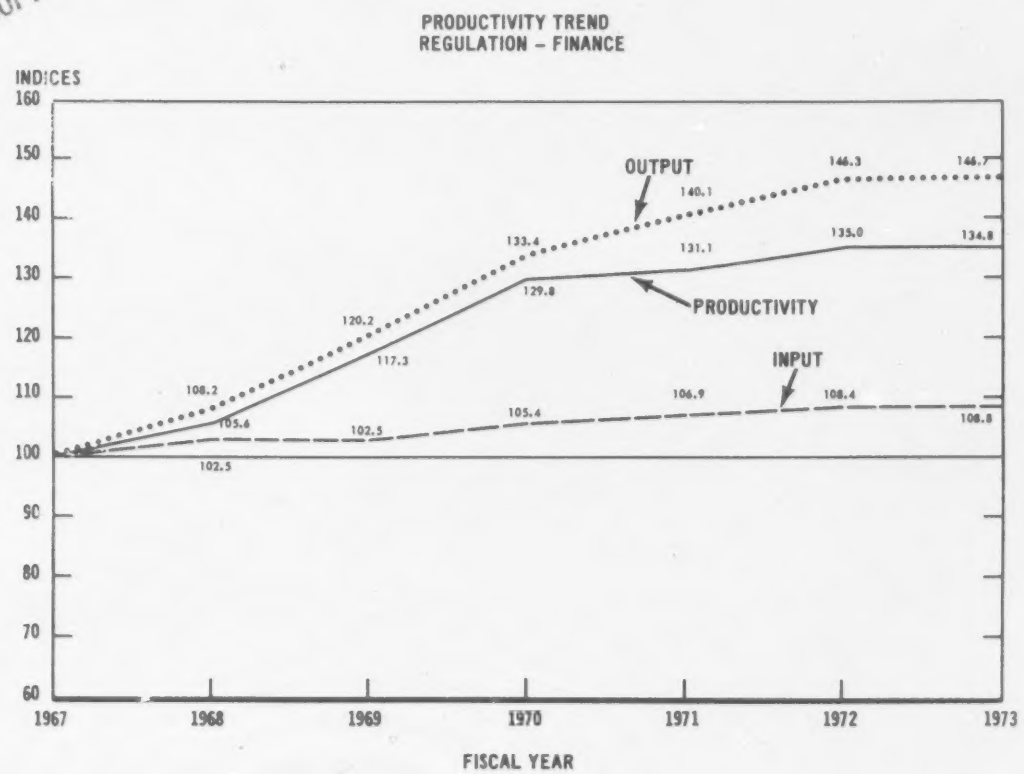
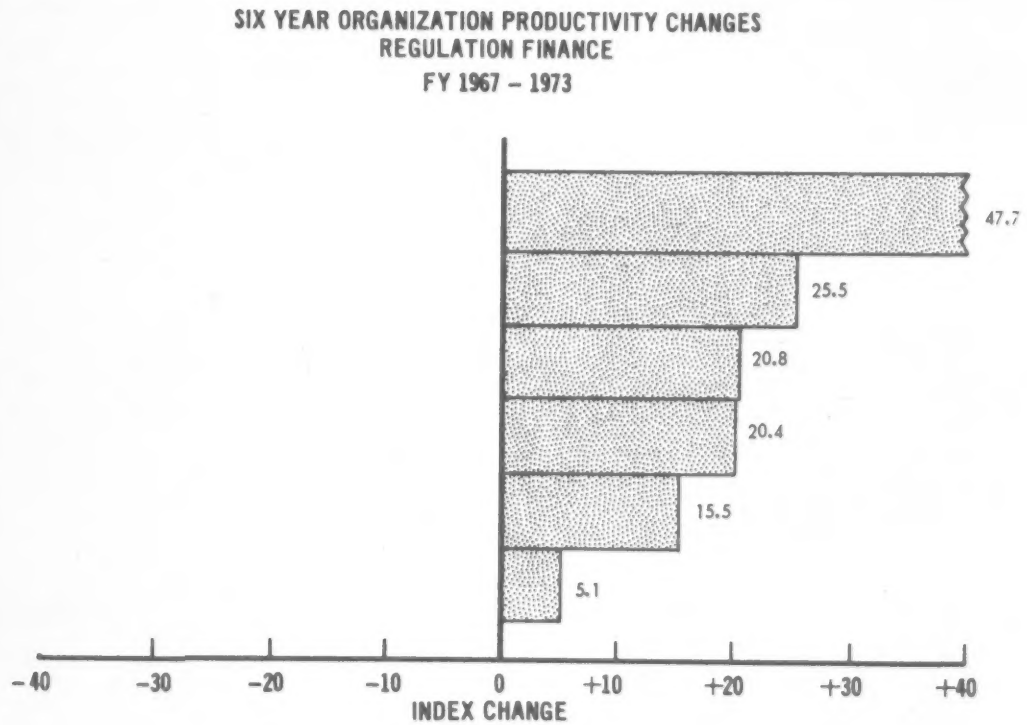


All six organizational elements showed productivity gains between FY 1967 and FY 1973. Four of the six elements experienced significant gains in output, while the other two achieved a productivity gain by reducing input. Four of the six elements achieved productivity gains of over twenty percent over the period. The frequency distribution of the changes is shown in Exhibit 11-9.

EXHIBIT 11-9



INSPECTION AND ENFORCEMENT

NATURE AND SCOPE

This subfunctional category included those activities responsible for assuring product safety by inspection of products and facilities. It also includes law enforcement activities within the Justice and Treasury Departments.

The function includes 17 organizational elements from six agencies. These elements contain over 40,000 man-years. The data base is shown in Exhibit 11-10.

EXHIBIT 11-10

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Agriculture:			
Agricultural Marketing Service	3,351	13	Warehouse examinations made
Animal and Plant Health Inspection Service:			
Meat and Poultry	9,427	4	Pounds inspected
Veterinary Services	2,405	13	Animals inspected
Plant Protection and Quarantine	2,052	49	Samples processed
Packers and Stockyards	52	2	Registrations processed
Health, Education, and Welfare:			
Food and Drug Administration	5,904	9	Import samples examined
Justice:			
Civil Division	435	1	Cases terminated
Criminal Division	668	3	Matters processed
Tax Division	445	1	Cases closed
Board of Parole	65	1	Decisions concluded
Bureau of Prisons	3,991	13	Average daily inmate population
National Transportation Safety Board:			
Entire Agency	274	5	Legal tasks completed
Tariff Commission:			
Measured Activities	55	2	Investigations completed
Treasury:			
Bureau of:			
Alcohol, Tobacco and Firearms	1,470	3	Inspections completed
Customs, Cargo Processing	7,054	1	Formal entries processed
Customs, Mail Processing	732	1	Mail entries processed
Customs, Processing Persons	1,804	5	Sea carriers entered
Total	40,184	126	

PRODUCTIVITY TREND

The productivity for this subfunction gained almost 22 percent through FY 1970, dropped drastically during the next two years, then returned to the FY 1970 level in FY 1973. This pattern was caused by rapidly rising output through FY 1970, coupled with slight input decreases. In FY 1971 and FY 1972 the output rise slowed dramatically while input rose sharply, causing productivity to drop. In FY 1973 output increased substantially and input increased only slightly, causing the productivity jump.

The average annual rate of productivity growth was 3.3 percent over the 6-year period. A graph showing changes in input, output and productivity over the 6-year period is shown in Exhibit 11-11.

EXHIBIT 11-11

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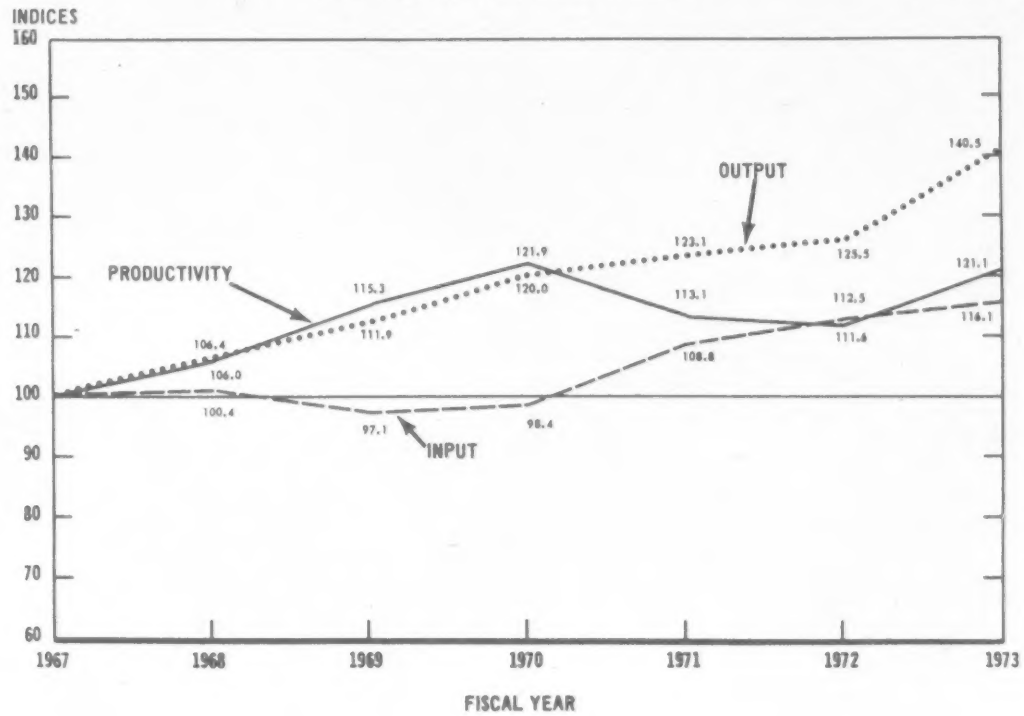
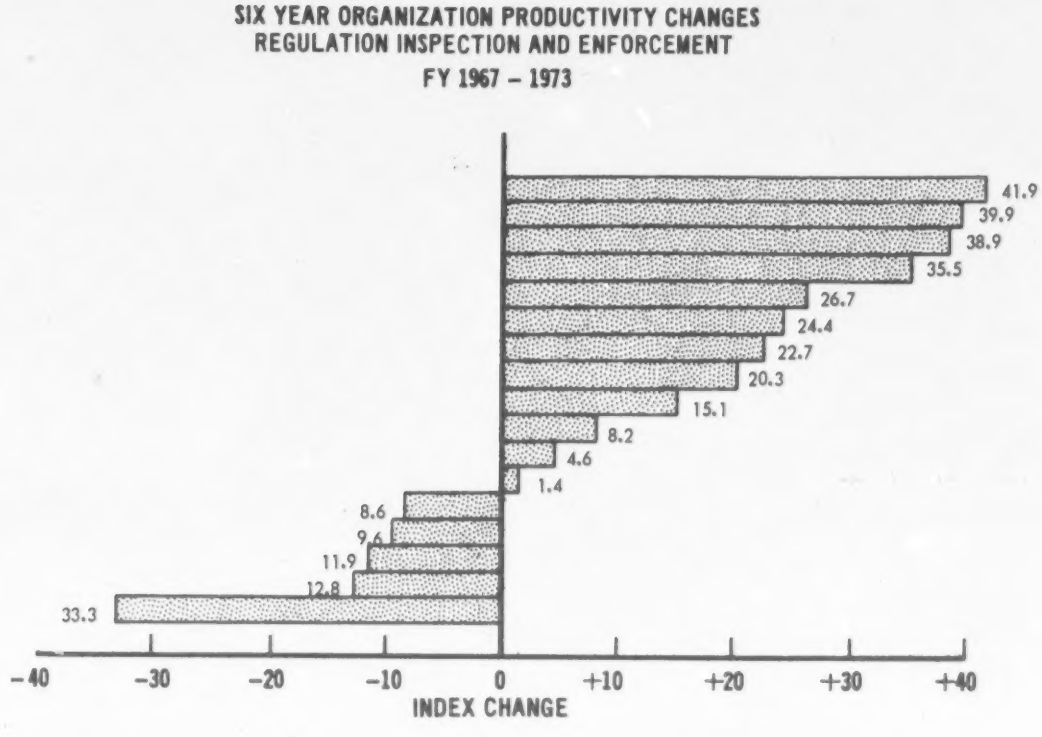
PRODUCTIVITY TREND
REGULATION – INSPECTION AND ENFORCEMENT



An analysis of productivity change by organizational element over the 6-year period shows gains for 12 elements and declines for five. Gains ranged from a low of only 1.4 percent to a high of 41.9 percent over the 6-year period. Declines ranged from 8.6 to 33.3 percent. Large gains were experienced by most of the 12 elements. The productivity change by element is shown in Exhibit 11-12.

EXHIBIT 11-12



One element shows a productivity loss over the 6-year period of over 30 percent. This is due to increasingly complex work content for which adjustments cannot be quantified.

ANALYSIS OF CAUSAL FACTORS

In commenting on the reasons for productivity gains most agency representatives attributed them primarily to management actions. Reorganizations were given by a number of elements as the reason for gain. Others cited simplification of work processes or procedures and new techniques.

For example, the Federal Communications Commission's Broadcast Bureau instituted a study to simplify its procedures by eliminating outdated rules. It found many poorly written or outdated rules which were causing significant processing inefficiencies. To date, 75 major subjects have been studied and 225 rules amended or clarified. This has resulted in elimination of 23 unnecessary filing or notification requirements. Other specific items mentioned by other regulatory elements were:

--Introduction of new audit procedures resulted in a 1-year gain of 22 percent.

--Work simplification resulted in a cut in processing time of 50 percent.

--Centralization of support functions and decentralization of program area.

--Implementation of an abbreviated food inspection procedure with no loss in quality.

--Consolidation of local laboratories.

--Use of sampling procedures.

--Batch processing.

Automation was given as a reason for productivity gains by six of the elements and one element cited a capital investment in mobile food and cosmetic sampling laboratories as a major factor in increasing productivity.

The overwhelming obstacle to productivity improvement was seen as increasing effort per unit of output processed. A number of elements in this function expressed reservations about the indexes because of an inability to measure these changes quantitatively. In these instances this causes an understatement of productivity. Other obstacles mentioned included:

--Large number of retirements of qualified personnel.

--Influx of new hires increases training workload and increases nonproductive time.

--Difficulty in obtaining capital investment money to acquire sorely needed items of capital equipment.

PREDICTION OF FUTURE TREND

Most of the elements commenting felt that productivity should increase in the near future. The following reasons were given:

--A more effective planning system plus the development of mathematical models.

--Computerization of the information processing system.

--Development of a common data base.

--Comprehensive review to streamline regulations.

--Improved forms design.

--Improvement in processes and procedures.

NEXT STEPS FOR IMPROVEMENT

The major thrust of future improvement efforts should be on developing and refining improved output measures for many of the organizational elements in the regulatory function.

CHAPTER 12

PRODUCTIVITY TREND-SPECIALIZED MANUFACTURING

NATURE AND SCOPE

This function encompasses government manufacturing activities which are unique or of a specialized nature. It covers currency, coin, and map printing.

The specialized manufacturing data base is comprised of five organizational elements from four agencies. It encompasses over 16,000 man-years which are measured through 28 output products. The output products include coins produced, currency notes printed, stamps printed, and maps and charts printed. The data base is shown in Exhibit 12-1.

EXHIBIT 12-1

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PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Commerce:			
National Oceanic and Atomospheric Administration- Ocean Survey	2,120	5	Nautical charts completed
Defense:			
Defense Mapping	7,520	3	Aeronautical production units
Interior:			
Geological Survey- Map Production	143	1	Maps and charts printed
Treasury:			
Bureau of Engraving and Printing	3,831	14	Currency notes delivered
Bureau of the Mint	2,499	5	Millions of coins produced
Total	16,113	28	

PRODUCTIVITY TREND

The function achieved significant productivity gains due to substantial output increases with slight changes in the input. Productivity peaked at 139.8 in FY 1971 and has dropped for the last two years to 128.1 at the end of FY 1973. Output rose over 44 percent between FY 1967 and FY 1971, then dropped during FY 1972 and 1973. The major portion of this increase occurred in FY 1971 because of a significant rise in the output of the Bureau of Engraving and Printing. The drop in output during FY 1972-1973, coupled with an input increase, caused the productivity decline during these two years. Even with the decline in the last two years, the average annual rate for the six year period increased 4.2 percent. The input, output and productivity trends are shown in Exhibit 12-2

EXHIBIT 12-2

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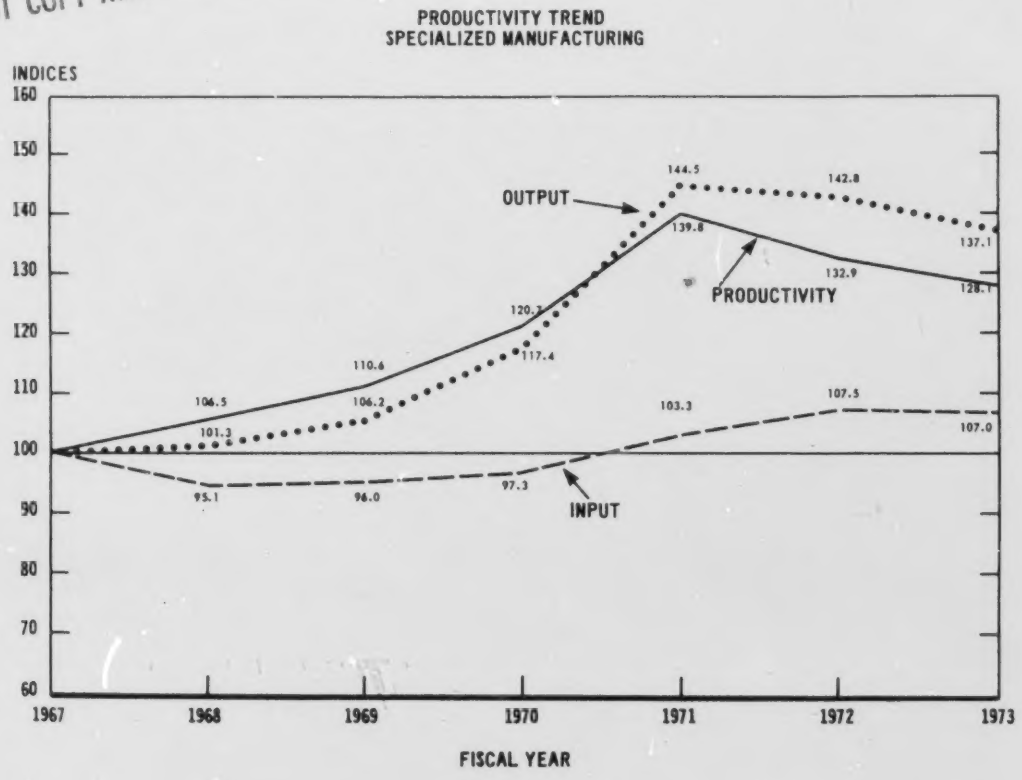
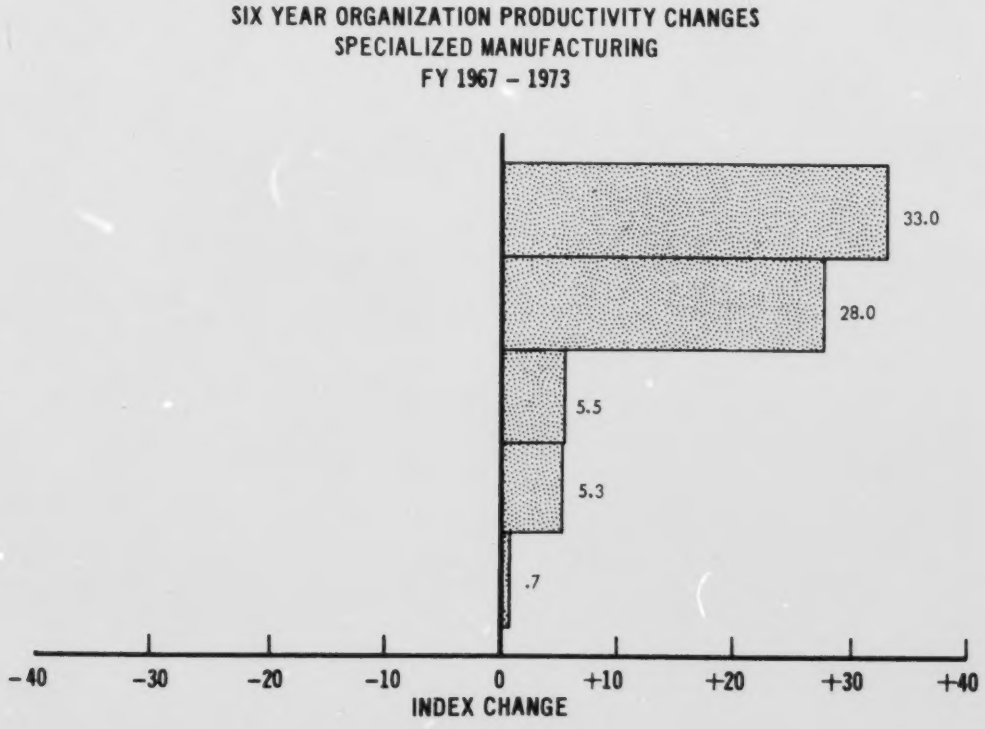


Two of the organizational elements showed significant average annual gains during the period, two others increased at less than 1 percent per year, and one remained about stable. The six year change by element is shown in Exhibit 12-3.

EXHIBIT 12-3



Elements within this function are very susceptible to productivity gain through capital investment. The evidence of successful capital investment can be seen for the two elements which have shown large gains over the six year period. One of the other three elements has just recently begun to realize the benefits of capital investment. The other two elements had measurement data for only two years in one case and three years in the other.

To gain a further insight into productivity change a productivity index was computed on the basis of deflated labor

cost. This labor cost index is shown in Exhibit 12-4 compared to the output per man-year index discussed previously.

EXHIBIT 12-4

MAN-YEAR AND LABOR COST INDEXES

Productivity	FY 1967	1968	1969	1970	1971	1972	1973
Man-year	100.0	106.5	110.6	120.7	139.8	132.8	128.1
Labor cost	100.0	105.1	110.7	123.6	148.5	147.5	143.8

There is no significant difference between the indexes until FY 1971 when the labor cost index is considerably higher than the output per man hour index. Some organizational elements within this function were able to reduce dollar cost per man-year after FY 1971. This was attributed to a lower skill mix and grade reductions. This condition is also evident in the unit cost index which is shown in Exhibit 12-5.

EXHIBIT 12-5

UNIT LABOR COSTS INDEXES-SPECIALIZED MANUFACTURING

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	100.9	104.4	104.1	96.3	105.4	114.4
Constant $	100.0	95.2	90.4	80.9	67.3	67.7	69.5

ANALYSIS OF CAUSAL FACTORS

Since the elements within this function are engaged primarily in manufacturing or industrial activity, it is not surprising that capital investment was given as the main reason for productivity gains. For example:

--Procurement of multi color and higher speed presses.

--Procurement of mechanical collators.

--Procurement of overprinting and fully automated printers.

--Acquisition of new analytical instruments which sort out defective coins by sound.

--Procurement of presses which stamp twice as many coins per stroke.

--Acquisition of binding and folding machines.

--Acquisition of new endorsing machine.

Related to capital investment, but more specifically automation-type actions, were the following:

--Automation of the movement of coins through the various processes.

--Palletization of coin shipments decreased manual handling and resulted in decrease in shipping costs.

--Introduction of an automated workload planning system.

--Purchase of special size envelope which made automated envelope stuffing possible.

Other actions responsible for improvements were as follows:

--Improvement in work evaluation techniques.

--Use of employee opinion surveys.

--Team concept and job rotation for low paid menial jobs.

--Elimination of duplicate activities.

--Reorganization which saved 221 man-years.

A number of obstacles to productivity improvement were cited, but the most crucial was the problem of timely financing of capital investments. One activity cited a six year time frame for major capital equipment acquisition and another cited a lid on capital investment as a roadblock to improvement. Other problems cited were:

--Reduction-in-force, personnel ceilings, and grade constraints which make it difficult to obtain and keep qualified employees.

--Retirement of skilled personnel.

--Shortages of basic supply items (paper, cloth).

Some progress has been made in overcoming capital investment problems, notably in the Bureau of Engraving and Printing, which has negotiated unique arrangements for acquiring equipment on a lease-purchase basis. (Case studies for Defense Mapping Agency, Bureau of Engraving and Printing, and Bureau of the Mint are presented in Volume II, Chapters 4, 9, and 10.)

PREDICTION OF FUTURE TREND

Elements within this function see future productivity improvements, but a stable productivity trend for the near term. Present material shortages offset gains in the near future. Long term gains are expected due to:

--Continued investment in modern, faster equipment.

--Introduction of statistical sampling procedures.

--Acquisition of more modern facilities.

--Standardization of press tooling among mint offices.

--Introduction of a computer accounting system.

--Introduction of a pin register system which should reduce set up and fit time on printers.

CHAPTER 13

PRODUCTIVITY TREND-TRANSPORTATION

NATURE AND SCOPE

This functional category is composed of organizational elements responsible for providing service to air and water transportation. One element is primarily responsible for rendering assistance to ships, including those in distress; two elements provide services to ships navigating the Panama Canal and the St. Lawrence Seaway, and one element is responsible for control of and assistance to air traffic.

The data base includes five organizational elements from three agencies. It includes a total of over 113,000 man-years which are measured through 16 output products. Specifically, the data base is shown in Exhibit 13-1.

EXHIBIT 13-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Canal Zone Government:			
Panama Canal Company	15,535	1	Net tons transited
Justice:			
Marshals Service - Prisoner Movement	69	1	Prisoners moved
Department of Transportation:			
St. Lawrence Seaway	180	1	Net tons transited
U. S. Coast Guard	45,380	12	Aids to navigation administered
Federal Aviation Administration	52,373	1	Weighted composite
Total	113,537	16	

PRODUCTIVITY TREND

Productivity for this function rose through FY 1970, dropped in FY 1971, then rose again through FY 1973. Output increased each year, except FY 1971 while input increased through FY 1971, then remained relatively stable through FY 1973. Productivity reached 123.1 in FY 1973. Although workload declined in FY 1971, for one of the major elements input was increased because of a long training cycle. Output gained 35 percent over the six year period while input increased 10 percent.

The FY 1973 productivity index of 123.1 represents an average annual rate of gain of 3.5 percent over the six year period. The behavior of the output, input and productivity indexes is shown in Exhibit 13-2.

EXHIBIT 13-2

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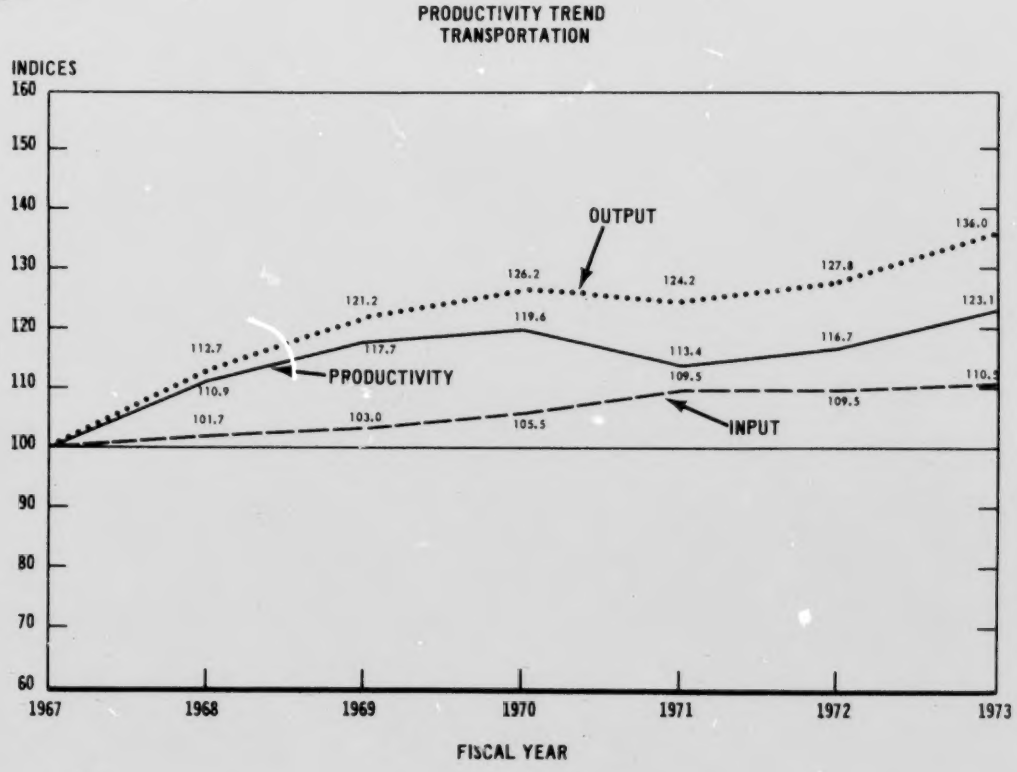
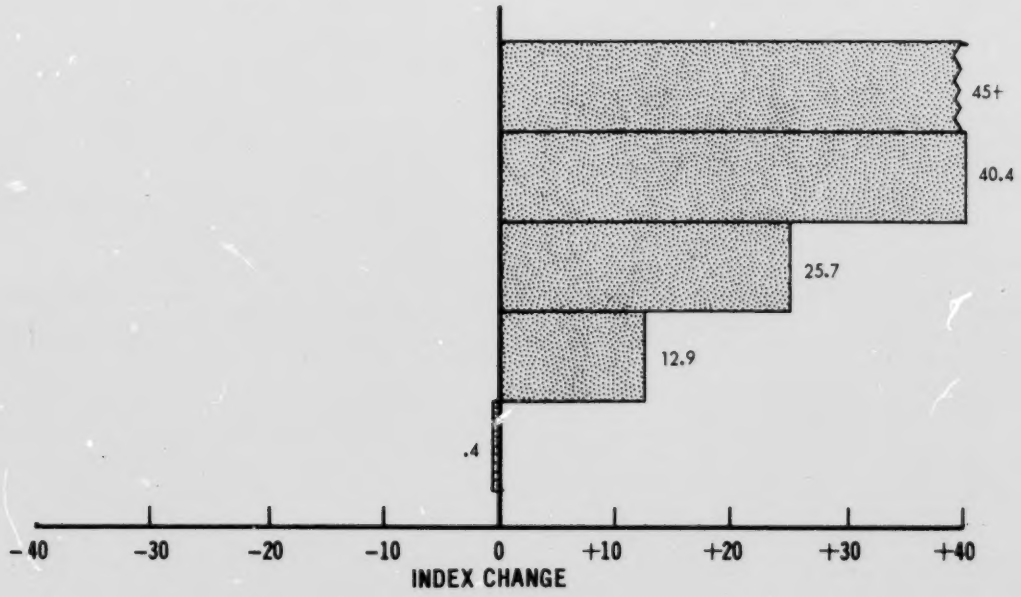


Four of the five elements showed productivity gains over the six year period, while one showed a slight decline. All five elements experienced output increases varying from 5 to over 90 percent. Four of the five elements increased man-year input while one decreased input by about 4 percent. The individual element changes are shown in Exhibit 13-3.

EXHIBIT 13-3

SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES
TRANSPORTATION
FY 1967 – 1973



The impact of productivity change can be expressed as an index of constant dollar unit costs. The following indexes were developed using labor cost data rather than man-years as the input. The constant dollar unit cost index is the reciprocal of the productivity index based on labor cost. The unit labor cost is shown in Exhibit 13-4.

EXHBIT 13-4

UNIT LABOR COSTS-TRANSPORTATION FUNCTION

	FY 1967	1968	1969	1970	1971	1972	1973
Current	$100.0	95.3	100.0	115.2	134.7	142.2	139.4
Constant	$100.0	89.9	86.6	89.5	94.2	91.4	84.7

The table shows that this function's productivity gains were sufficient during FY 1968 and FY 1969 to offset the rate of inflation. (Index based on current dollars.) Following this period the productivity gain rate slowed considerably and inflation overtook the rate of productivity increase.

ANALYSIS OF CAUSAL FACTORS

Automation was a primary factor contributing to productivity gains of this functional element. Specific examples cited were:

--Air traffic control automation at terminals and flight service stations.

--Automation of internal procedures.

--Automation of vessel control traffic systems has resulted in better scheduling and less waiting time.

Closely related to automation is investment in capital equipment which has helped to increase productivity of some of the elements. Some of these items are:

--Beginning of a program to replace propeller aircraft used by FAA inspectors with new jet aircraft.

--Investment in vessel traffic control equipment improvements.

--Installation of ice supression and retention devices.

One of the organizations cited a reorganization as being responsible for reducing paperwork, increasing management control of programs, increasing employee morale, and improving productivity.

A number of obstacles to productivity improvement were cited, including the following:

--Increases in service complexity through rapid technological changes in navigation and avionics equipment.

--Personnel disincentives in terms of pay and hiring freezes.

--Difficulty in projecting because of random demands based on economic conditions.

PREDICTION OF FUTURE TREND

Representatives of agencies within this function foresee a continuing upward productivity trend due to a number of factors. Some factors cited were:

--Acquisition of a prototype computer program for automating route flow control procedures now manually performed by FAA.

--Use of solid state computer equipment to reduce maintenance and downtime.

--Further computerization of vessel traffic control.

--Continuation of the program of replacing propeller aircraft with jet aircraft.

NEXT STEPS FOR IMPROVEMENT

The data base includes the major non-defense transportation functions, but there is considerable expansion potential within the Department of Defense. Large transportation-related elements operated by the Department of Defense are expected to be covered in the next two years. Further work will be done to subdivide present measures to allow for adjustment for changes in complexity.

CHAPTER 14

PRODUCTIVITY TREND-MAINTENANCE OF FACILITIES

NATURE AND SCOPE

This functional category encompasses maintenance of Government-owned facilities and equipment and operation of service facilities. Major participants are the General Services Administration and the Department of Defense. Many of the employees involved in this function are engaged in maintenance and repair of real property, including such activities as cleaning, security, minor repairs, and general upkeep of government buildings, grounds and equipment. Also included in the function are related activities such as utility services, refuse collection, and laundry services.

Over 56,000 manyears of effort have been measured through 19 output products from 8 organizational elements of 4 agencies. The data base is shown in Exhibit 14-1.

EXHIBIT 14-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Commerce:			
Maritime Administration - Reserve Fleet	281	1	Ships preserved
Defense:			
Army -			
Base Services	11,477	3	Pieces of laundry processed
Maintenance and Repair of Real Property	12,189	1	Square feet maintained
Operation of Utilities	2,243	1	Population served
Other Engineering Support	8,497	1	Square feet of buildings
Navy -			
Public Works (partial)	801	5	Half ton trucks maintained
General Services Administration:			
Public Buildings Service - Building Management	20,446	3	Average square feet cleaned
Smithsonian Institution:			
Buildings Management	768	4	Visitors to buildings
Total	56,702	19	

PRODUCTIVITY TREND

This function experienced declining output, primarily because of the phasedown following Vietnam, but managers were able to reduce input (except for FY 1972) and thereby maintain productivity above the base year level. With FY 1967 as the base year, productivity increased 10 percent through FY 1971, declined 1.8 percent in FY 1972, and further declined 2.5 percent in FY 1973, ending at 105.5.

An average annual gain of .9 percent per year was achieved over the 6-year period. This gain was realized by an input reduction of over 14 percent in the face of an output reduction of slightly less than 10 percent. The maintenance of positive productivity trends when output is steadily declining represents a significant accomplishment. The trends are shown in Exhibit 14-2.

EXHIBIT 14-2

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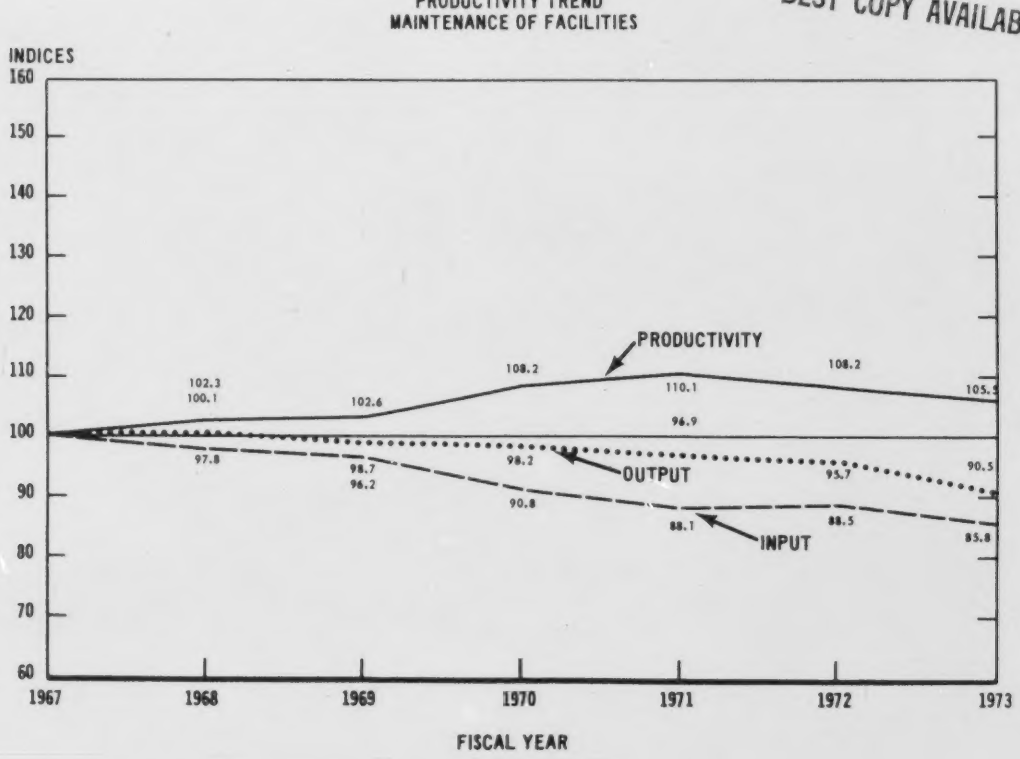
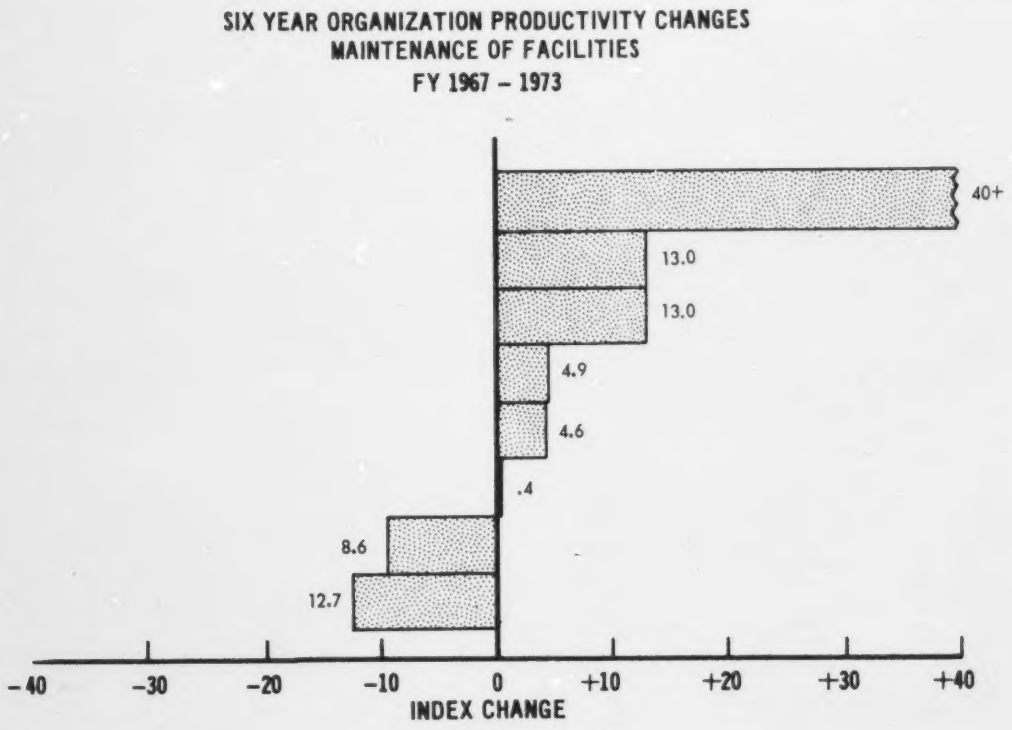


Analysis of productivity change for individual elements disclosed that for seven elements, the FY 1973 (FY 1967=100) productivity index falls between ± 15 percent of the base year. Five of the eight elements show significant productivity gains over the period, one is relatively stable, and two show productivity declines. The 6-year change by element is shown in Exhibit 14-3.

EXHIBIT 14-3



The element which achieved a gain in excess of 40 percent over the 6-year period attributed its success to automation of a work scheduling system and purchase of more efficient equipment.

To aid in further analysis of productivity change, agencies were asked to submit labor costs along with the man-year input information. Using standard government wage deflators, it was possible to compute productivity indexes based on constant dollar labor input and to analyze labor cost per unit. This analysis shows productivity gains in terms of reductions in cost per unit of output. The following table shows the trend of unit costs in current and constant dollars (FY 1967= 100). The unit cost in constant dollars declined 9 percent between fiscal years 1967 and 1973 as compared to a rise of 50 percent in current dollars. These trends are shown in Exhibit 14-4.

EXHIBIT 14-4

UNIT LABOR COST INDEXES-MAINTENANCE OF FACILITIES

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	104.5	106.7	108.5	121.3	136.5	150.2
Constant $	100.0	98.6	92.4	84.3	84.8	87.7	91.3

ANALYSIS OF CAUSAL FACTORS

Productivity gains in this functional category have been achieved primarily through capital investment. Agency representatives cited the following as responsible for productivity improvement:

--Purchase of new food service equipment.

--Construction of new commissary facilities with improved store layout.

--A 10-year equipment modernization program for Army laundries with an investment of $3 million annually.

--Purchase of modern compactor trucks for trash disposal.

--Construction of newer steam generation plants.

In the area of automation the following specific items were cited:

--Automation of a public works scheduling system.

--Automation of some phases of laundry plant operations.

--Implementation of an information system designed to provide managers at all levels a common source of information.

Management actions also led to productivity gains. In one case, a 3-week visit by a specialist led to dramatic improvements in both quality of service and productivity at a laundry operation. Other management actions included:

--Consolidation and reduction in number of dining facilities.

--Work simplification program.

--Implementation of a project team concept of operation whereby "cradle-to-grave" responsibility for specified projects is given to a team rather than splitting responsibility along functional lines.

--Establishment of work and production control systems.

--Employment of higher calibre personnel.

--Upward mobility program.

A number of obstacles to productivity improvement were cited, but the main issues were declining output and the difficulty of timely capital investment. Some examples of inefficiencies due to delays in capital investment were:

--An over age fleet of vehicles.

--Poor condition of buildings and mechanical equipment.

--Continued use of small inefficient dining facilities.

The reasons given for the capital investment problem were:

--Legislative constraints in terms of long lead times from identification to actual acquisition.

--Regulations which require excessive paperwork to gain approval for replacement equipment purchases unless replacement is one for one.

--Internal agency funding problems, especially when 1-year funds must be used, because lead time for major item purchases is considerable. This was cited by one organization as a crucial problem because an average of 9 months elapsed between initial order of the equipment and actual contract award.

Other obstacles to productivity improvement cited were:

--Lack of adequate training of employees.

--Increases in product complexity.

--Lack of adequate employee skill level caused by inability to replace skilled personnel.

--High personnel turnover rates.

--Work scheduling problems caused by major work organization change.

PREDICTION OF FUTURE TREND

In commenting on the future productivity of this function, organizational representatives felt that trends would be either stable or slightly upward. Some gains were predicted due to the following:

--A change from natural to synthetic fiber will allow a threefold increase in the productivity of laundry operations.

--Hiring of more skilled craftsmen to replace the unskilled people presently employed in the buildings maintenance area.

--Improvements in the trash collection system.

Two other items were mentioned as potential improvements, contingent on fund availability and favorable economic analysis. They were:

--Construction of modern automotive repair shops

--A system of centralized food preparation to serve various dining facilities.

NEXT STEPS FOR IMPROVEMENT

There appears to be a potential for expansion of coverage in measuring productivity of Defense activities and DOD is taking actions to increase coverage.

Some of the measures being used are "proxy", e.g., "population served" measures. However, efforts are underway to identify better measures for these functions.

A review is underway to divide this function's elements into subfunctions such as building maintenance, dining facilities, laundries, etc. Such a subdivision should increase the usefulness of the productivity trend data.

The General Services Administration is undertaking actions to develop and coordinate use of standards and measurement methods for maintenance activities.

CHAPTER 15

PRODUCTIVITY TREND-

OVERHAUL AND REPAIR OF EQUIPMENT

NATURE AND SCOPE

This function is comprised of the heavy industrial activities of the military services. It includes (1) aircraft overhaul functions of the Navy and Air Force, (2) tank and vehicle overhaul functions of the Army, (3) ordnance manufacture operations of the Navy, and (4) a portion of the Navy ship overhaul activity. It includes over 95,000 man-years from six organizational elements measured through 12 output products as shown in Exhibit 15-1.

EXHIBIT 15-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Defense:			
Air Force Logistics Command -			
Maintenance	44,213	4	Aircraft processed
Army -			
Materiel Maintenance	11,245	1	End items completed
Depot Maintenance	5,332	1	Weighted equivalent
Navy -			
Air Rework	30,938	3	Engines overhauled
Ordnance	2,905	2	MK 82 Bombs produced
Shipyard Overhaul (partial)	601	1	Composite work unit
Total	95,234	12	

PRODUCTIVITY TREND

Productivity data for this function covers the period FY 1968-1973. The function experienced a drastic drop in output between FY 1969 and FY 1971, rose in FY 1972, then dropped in FY 1973 to 84.3. Input behaved in a similar manner.

The productivity index of 108.4 at the end of FY 1973 represents an average annual gain of 1.6 percent over the five year period. This gain was achieved despite the substantial decline in output during this period. The trends are shown on the graph below (Exhibit 15-2).

EXHIBIT 15-2

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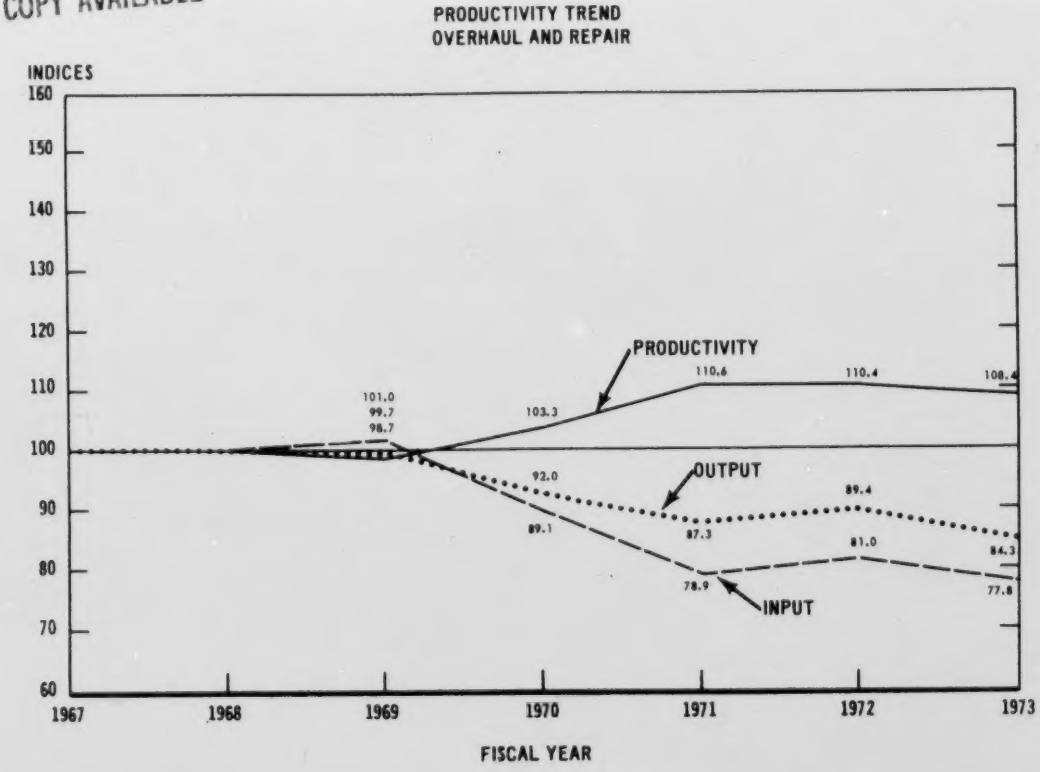

It should be noted that this year's data base represents a significant revision as compared to the results shown in last year's report. Several elements felt that their data for some years was incomplete and partial due to change in data reporting systems and to the appropriateness of the weighting of aircraft and other products in relation to their relative complexity. Efforts are underway to produce better output measures for future submissions.

Productivity change by organizational elements ranged from a decrease of 19 percent to an increase of about 30 percent over the five year period. Two elements showed significant declines, one was about stable, while the other two showed increases. A distribution of the changes by element is shown in Exhibit 15-3.

EXHIBIT 15-3

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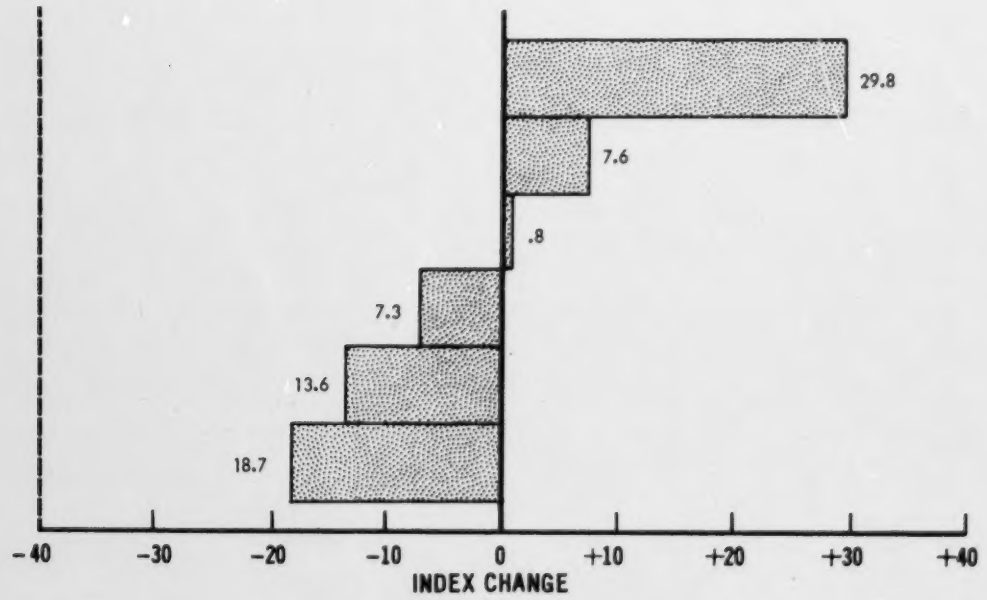
SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES
OVERHAUL AND REPAIR OF EQUIPMENT
FY 1967 – 1973



A productivity index based on deflated wage cost was computed, along with the output per man-year indexes shown above, to supplement the man-year data and to yield a unit labor cost analysis. This analysis shows productivity gains reflected in terms of reduction in cost per unit. The following table (Exhibit 15-4) shows that productivity gains were not sufficient to hold the line on current dollar unit costs, but they did reduce unit costs on a constant dollar basis.

EXHIBIT 15-4

UNIT LABOR COST INDEXES-OVERHAUL AND REPAIR

	FY 1968	1969	1970	1971	1972	1973
Current	$100.0	110.3	117.5	121.9	133.1	143.2
Constant	$100.0	101.3	96.8	90.4	90.7	92.2

ANALYSIS OF CAUSAL FACTORS

Because this functional area is capital-intensive, most productivity gains were attributed to capital investment in facilities or equipment. The following are examples cited by the elements involved:

--Depot Plant Modernization Program whereby old facilities are being replaced.

--Installation of remote and time sharing terminals to expedite paperwork processing.

--Installation of automatic test equipment.

--Upgrading and modernizing material maintenance equipment.

Although capital investment was the primary means of achieving improvements, one element identified a $22.3 million savings in 1 year resulting from method and process improvements. Other items involved were:

--Intensified management of high volume workload.

--Pilot projects in behavorial science application.

--Work package simplification.

--Change in coating procedures for engines reduced time to perform the entire process by removing a contamination problem.

The main obstacles to productivity improvement cited were capital investment funding and personnel problems. The following funding problems were cited:

--Reductions in funding levels of long term approved capital investment projects.

--$1,000 limit on the amount which can be spent to procure an item of equipment from industrial funds is unrealistically low.

--Lags in obtaining funding approved for recognized fast payback capital investments.

In terms of personnel problems, the following were cited:

--Increases in non-productive time.

--Reduction-in-force actions which caused bumping and affected morale.

--Difficulty in adjusting personnel to workload.

PREDICTION OF FUTURE TREND

These functional elements are presently implementing productivity improvements which should produce future gains, but there may be time lags in obtaining the effect of the changes.

NEXT STEPS FOR IMPROVEMENT

The Air Force Logistics Command is presently implementing a massive reorganization of its depots which will result in specialization and elimination of some of the present duplication. (See case study in Volume II, Chapter 6.)

The Army Materiel Command has developed a productivity measurement model which measures activity by depot. (See case study in Volume II, Chapter 3.)

The biggest potential for additional coverage in the future is Navy shipyards. It is hoped that current efforts

will lead to more complete coverage in the next report. The Air Force is in the process of refining the output measures presently in use by implementing a "market basket" sampling approach to counting of its output products.

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PRODUCTIVITY TREND-PROCUREMENT AND SUPPLY

NATURE AND SCOPE

This functional category is comprised of those activities whose mission is to acquire and distribute materials and supplies. The function is predominately defense oriented as the bulk of the Federal procurement dollar goes for defense or defense support material.

The data base includes over 145,000 man-years of effort. These man-years are measured through 53 output products from 16 organizational elements within seven agencies. The data base is shown in Exhibit 16-1.

EXHIBIT 16-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Defense:			
Air Force -			
Air Force Logistics Command Procurement and Supply	31,645	22	Line items shipped
Army -			
Central Procurement Activities	6,714	1	Procurement actions executed
Base Supply Operations	11,608	1	Line items processed
Supply Depot Operations	15,877	1	Short tons received and shipped
Supply Management Operations	8,033	1	Line items processed
Navy -			
Inventory Control Points	5,401	1	Actions processed
Supply Centers	10,182	1	Line items processed
Marine Corps Supply Agency	895	1	Line items processed
Defense Supply Agency	49,208	8	Requisitions processed
General Services Administration:			
Federal Supply Service -			
Procurement	863	2	Contracts over $2500 awarded
Supply Control	789	4	Replenishment actions initiated
Supply Distribution	2,761	3	Deflated value of stock shipped
Inspection	391	1	Contracts closed
Supply Standardization	291	2	Cataloging actions taken
Government Printing Office:			
Procurement	315	1	Printing jobs processed
Interior:			
Bureau of Mines -			
Procurement	140	3	
Total	145,113	53	Line items processed

PRODUCTIVITY TREND

Since FY 1969 this function has experienced drastic drops in output, due primarily to the phase down from the Vietnam war. Output peaked at 108.9 in FY 1969 then dropped steadily to 77.6 in FY 1973. Man-year input has been reduced steadily since FY 1967 and stood a 72.2 at the end of FY 1973. Productivity peaked at 114.4 in FY 1969, dropped to 107.7 in FY 1970 and has remained about that level through FY 1973. The trends are shown in Exhibit 16-2 below.

EXHIBIT 16-2

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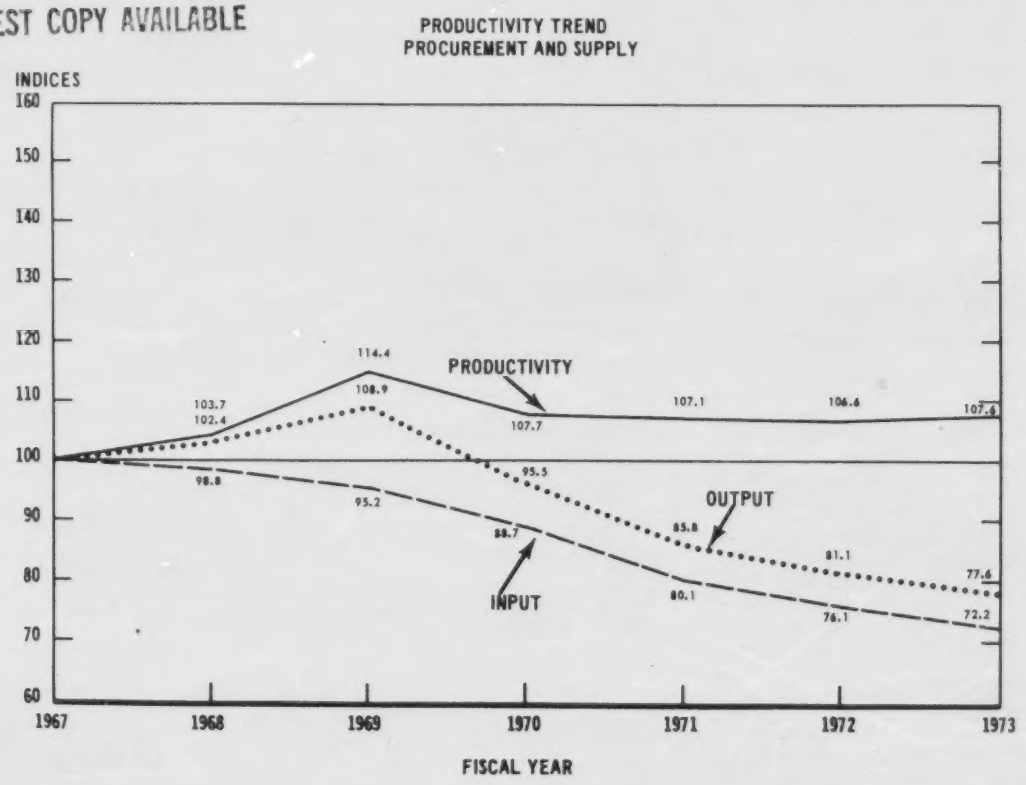


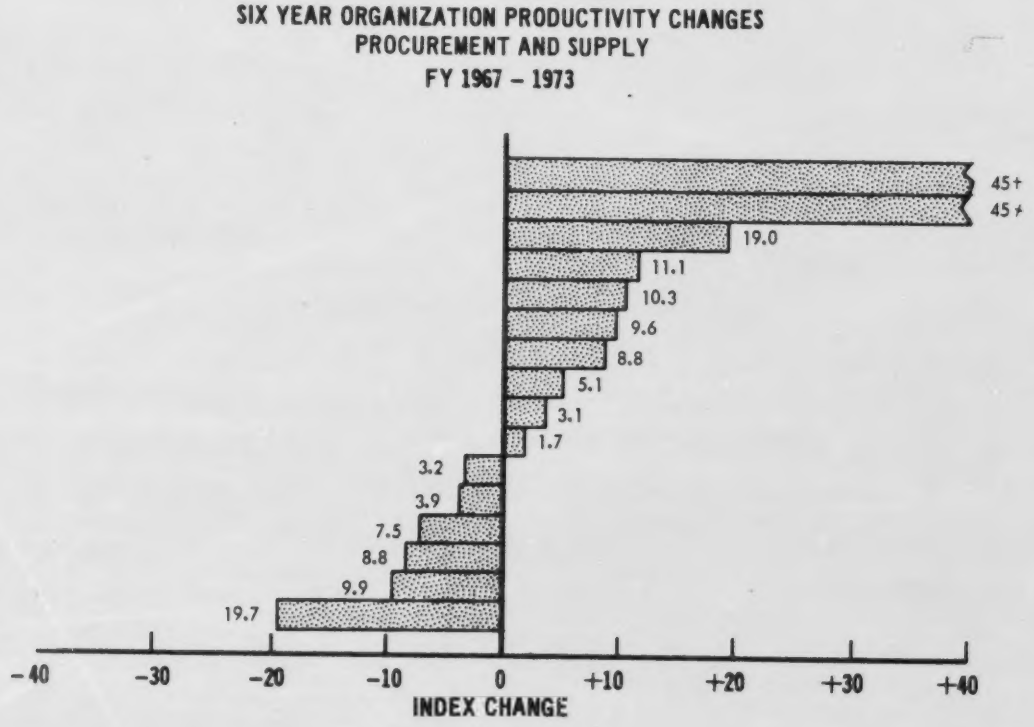
The productivity level of 107.6 at the end of FY 1973 represents an average annual gain of 1.2 percent per year over the six year period. To achieve this gain, man-year input had to be reduced almost 28 percent as output declined 22 percent during the six year period.

Analysis of productivity change by organizational element shows that two elements experienced large gains (in excess of

40 percent) over the six year period. For the remaining 14 elements the productivity index in FY 1973 falls between ± 20 percent of the base year.

Ten of the sixteen elements experienced positive productivity trends while the remaining six showed declines. The index changes by element for the six year period are shown in Exhibit 16-3.

EXHIBIT 16-3



One of the two elements which experienced a gain of over 45 percent in productivity over the six year period did so because its workload was susceptible to batch processing, which it effected, while the other was able to automate its operations and thereby achieve the large gain.

In an effort to analyze the dollar impact of productivity change, a productivity index based on wage dollars was also computed. This wage dollar index was converted to an index of changes in unit cost to depict changes in current and constant dollar unit cost over the six year period. Exhibit 16-4 shows this trend.

EXHIBIT 16-4

UNIT LABOR COST INDEX-PROCUREMENT AND SUPPLY

	FY 1967	1968	1969	1970	1971	1972	1973
Current $	100.0	102.0	94.9	114.4	127.6	135.5	139.8
Constant $	100.0	96.2	82.2	88.9	89.2	87.1	84.9

The table shows that, although productivity gains have not been able to hold the line on current dollar unit costs because of inflation, some offset to inflation has occurred. Constant dollar unit cost has been reduced about 15 percent.

ANALYSIS OF CAUSAL FACTORS

Capital investment and automation have been major agents of productivity gain. The following specific examples were cited as reasons for gain:

--Storage moderization.

--Acquisition of a small item warehouse and mechanized Materials handling equipment.

--Acquisition of driverless tractors and installation of conveyor system.

--Acquisition of automated labeling and stuffing machines.

--Installation of better lighting, storage racks and storage aids

--Installation of conveyor systems, automated strapping devices, automated small shipment movement devices, and shrink wrap units for packaging loose materials.

Other actions which agencies feel contributed to productivity improvement were:

--A realignment of the ammunition storage function whereby two ammunition storage facilities were converted to regular depots, thereby reducing personnel requirements.

--Change to direct supply support of overseas commissaries.

--Simplification of contracts and greater use of term contracts, thereby eliminating need for individual pre-award procedure.

--Personnel interchange program.

--Emphasis on incentive awards, upward mobility and intensified training programs.

--Paperwork simplification and forms reduction.

The primary roadblock or obstacle to productiivity improvement cited was an increase in the complexity of the workload. Specific examples were given as follows:

--Added requirement for taking inventories which had been postponed for the past few years because of heavy workload in the direct supply functions. This inventory effort is not counted in the output quantities.

--More complex type items are replacing those which are easier to handle.

--Increase in contract monitoring requirements.

Other obstacles cited related to personnel problems. Specific examples were as follows:

--Disruptions in trying to meet directed workforce reduction.

--Constant reduction-in-force actions.

--High turnover in lower grades.

--Reorganizations and reductions in personnel ceilings cause negative incentives in younger workers by bumping senior workers into their jobs.

'REDICTION OF FUTURE TREND

No clear trend is evident from summarizing the responses of the sixteen elements. The following is a summary of the responses.

Productivity will increase	8
Productivity will decline	5
Productivity will remain stable	3

Productivity has remained stable for the past four years but for the future only three elements believe this will continue. Considering the size of the various elements along with their predictions mentioned above, it appears there may be a small net increase in the near future. Future gains were seen resulting from the following:

--Continued emphasis on capital investment and automation.

For example:

.An automated packing facility should reduce cost by 80 percent.

.Set up a centralized receiving and issue facility connected to storage areas by tunnels or other more efficient property movement systems.

.Reorganization and facility consolidation to reduce duplicate functions and administration.

.Uniform standards for packaging and container size.

.More flexible worker interchange by cross-training.

.Simplification of contract language.

NEXT STEPS FOR IMPROVEMENT

Some improvement in the measures is needed to properly reflect the increasing complexity in the output products and to consider the impact of changes in work content on productivity.

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CHAPTER 17

PRODUCTIVITY TREND-STANDARD PRINTING

NATURE AND SCOPE

This functional category encompasses the Government's internal efforts to provide normal printing support for its many diverse activities. The function is comprised primarily of the Government Printing Office and the printing plants of the Department of Defense.

The function measures over 10,000 FY 1973 man-years of 18 organizational elements within 15 agencies through 40 output products. The data base is shown in Exhibit 17-1.

EXHIBIT 17-1

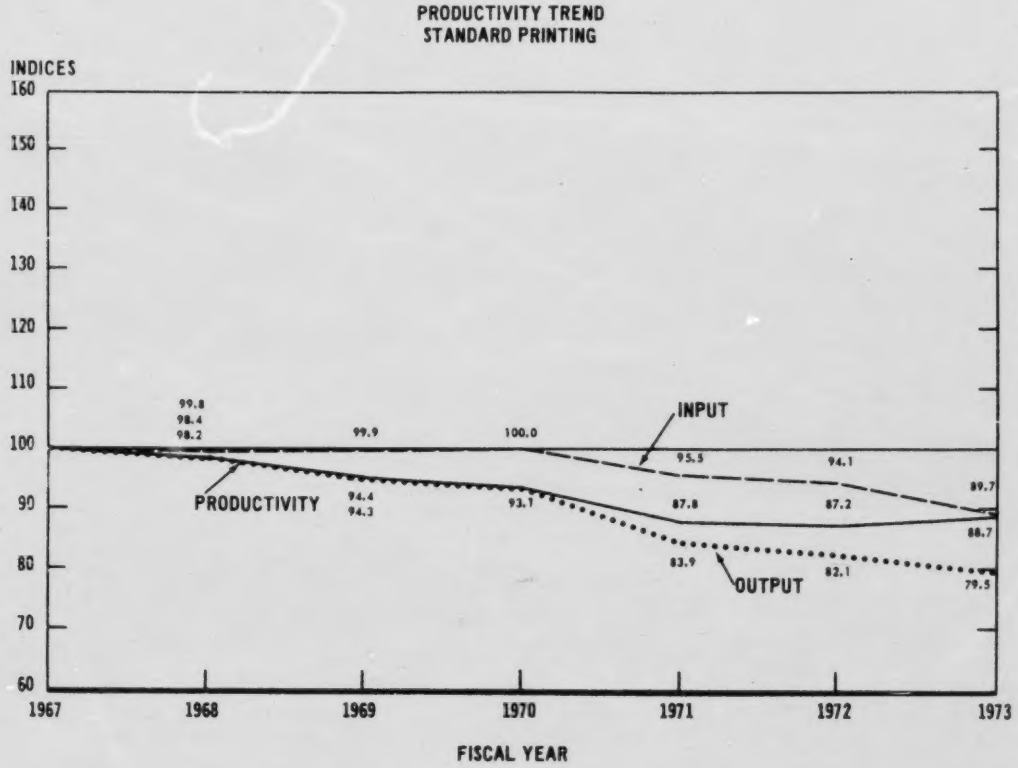
PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Output	Output Example
Agriculture:			
Office of Operations -			
Printing	151	0	Pages finished
Atomic Energy Commission:			
Technical Information Center	90	5	Documents bound
Canal Zone:			
Printing	63	1	Items printed
Civil Service Commission:			
Printing Plant	44	1	Items printed
Defense:			
Army -			
Printing	1,090	1	Total production units
Navy -			
Publications and Printing	848	1	Printing production units
Air Force -			
Printing	1,021	2	Industrial fund - prints processed
Federal Communications Commission:			
Printing	21	1	Impressions made
General Accounting Office:			
Printing Plant	22	3	Plates made
Government Printing Office:			
Production Department	6,402	10	Equivalent units printed
Health, Education, and Welfare:			
National Institutes of Health -			
Printing Plant	95	1	Impressions made
Departmental, Printing Plant	52	1	Impressions made
Housing and Urban Development:			
Printing Plant	18	1	Impressions produced
Interior:			
Printing	48	1	Impressions made
Labor:			
Printing and Reproduction	44	2	Pages printed
National Aeronautics and Space Administration:			
Langley Printing Plant	25	1	Pages printed
Tennessee Valley Authority:			
Printing	37	1	8 1/2 X 11 imprints made
U.S. Information Agency:			
Press and Publications	386	1	Impressions made
Total	10,457	40	

PRODUCTIVITY TREND

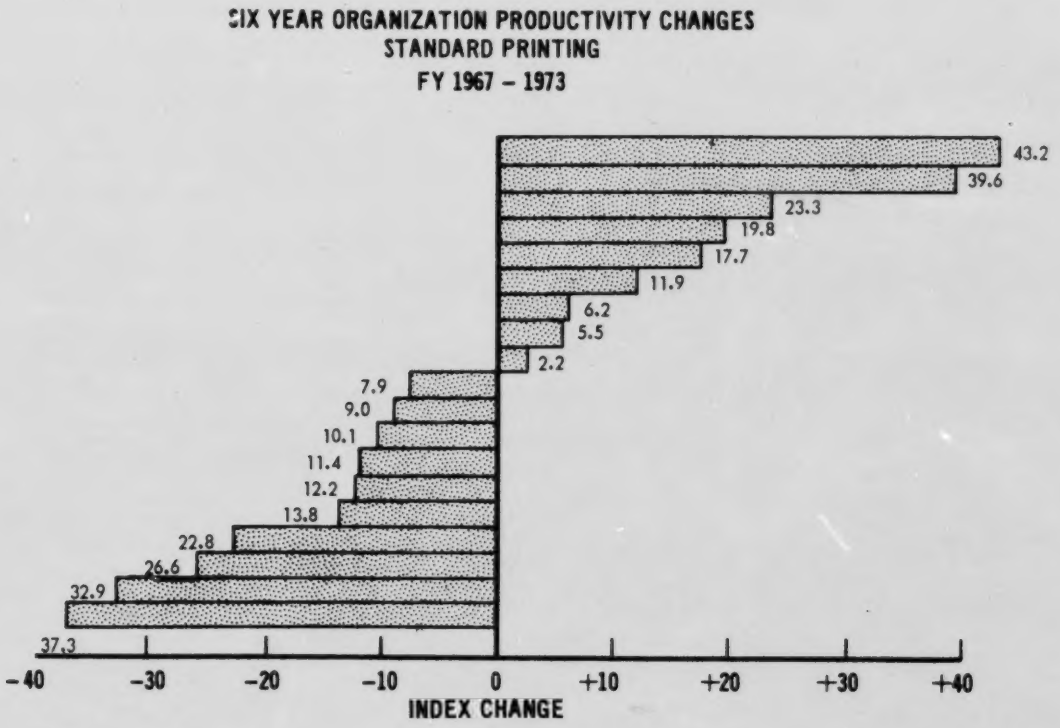
This function is one of two which experienced a decline in productivity over the 6-year period FY 1967-1973. Output declined each year from the FY 1967 base of 100 to 79.5 percent in FY 1973. Input remained at the base level through FY 1970, then declined to 89.7 percent in FY 1973. Productivity declined at an average annual rate of 2.9 percent from FY 1969-1971; the rate of decline slowed considerably during FY 1972 and there was a small increase in FY 1973. The average annual rate of decline for the 6-year period was 1.8 percent. The decline in productivity has been attributed primarily to the contracting-out of substantial amounts of relatively simple work. Exhibit 17-2 shows the trends for the period FY 1967-73.

EXHIBIT 17-2



Analysis of productivity change by organizational element shows a wide variety. Ten elements showed productivity declines and nine showed productivity increases over the period. The FY 1973 productivity index ranged from a low of 62.7 to a high of 143.2. The element with a 37.3 percent decline in productivity over the 6-year period had a whopping 60 percent drop in output, while the element with a 43.2 percent gain had a 65 percent increase in output. Five of the nine elements which experienced productivity gains also experienced output increases, while only two elements experiencing output declines were able to adjust input sufficiently to achieve productitity increases. A productivity table by organizational element is shown in Exhibit 17-3.

EXHIBIT 17-3



To supplement the analysis of man-year productivity trends, labor cost information was obtained and productivity indexes of deflated labor costs were developed. This data was used to obtain changes in labor cost per unit. Exhibit 17-4 shows that, because of productivity declines, the real

unit costs for this function are increasing. In terms of FY 1967 as a base, overall real unit labor costs have increased 12 percent.

EXHIBIT 17-4

UNIT LABOR COST INDEXES-

STANDARD PRINTING

	FY 1967	1968	1969	1970	1971	1972	1983
Current $	100.0	107.0	117.8	133.7	154.9	175.7	184.9
Constant $	100.0	100.9	102.0	103.9	108.3	112.9	112.3

ANALYSIS OF CAUSAL FACTORS

Capital investment and automation head the list of items responsible for productivity gains. The magnitude and extent of gains achieved have been held in check by the downward output trend in many of the elements, but there have been significant improvements. The following items were cited as responsible for gains which have occurred:

--Installation of computer equipment.

--Acquisition of higher capacity letterpress and more efficient varityper.

--Acquisition of rotomatic gathering machine and film processing machine.

--Improved equipment for producing diazo increased production from 120 to 550 units per hour.

--Acquisition of linotron system, adhesive binder, automatic sewing machine and electronic photocomposer.

--Acquisition of automated total center operation.

--Automation of plate making function at a cost of $12,000 saves $20,000 annually.

Many of the organizations in this group found various types of personnel management actions helped in improving productivity. Training of employees and supervisors was cited as a contributing factor. In the case of one relatively small organization, cross-training of employees improved productivity by providing more flexibility in responding to workload shifts. On the other hand, one large organization obtained better results through a high degree of specialization, with employees assigned to work areas where they have the greatest skills. In some cases good results were obtained by providing for direct involvement of employees with customers. Incentive award systems were also cited as factors leading to improved productivity. The important thing is that the training and other personnel management actions were related to the specific circumstances in the organizations involved.

A number of obstacles to productivity improvement were cited. The major reasons were change in output complexity or mix, personnel problems, and the contracting-out of a certain amount of printing. Increases in complexity resulted from the following:

--Increase in the amount or proportion of multi-color work.

--Change in mix from long-run to short-run jobs, which increases set up time.

--Contracting out of easier jobs and holding more difficult jobs in-house.

--Increased proportion of high priority jobs causes disruption of production schedules.

The following personnel-related obstacles were cited:

--Unexpected retirements and resignations of key personnel

--Increase in personnel turnover rates.

--Increase in non-productive time, e.g., training and union activity.

--Decline in employee work ethic.

PREDICTION OF FUTURE TREND

Agency representatives were optimistic about the future productivity trend for this function. Most element representatives felt the following would contribute to productivity gains in the future:

--Installation of an automatic stapler.

--Elimination of marginally operated plants.

--Acquisition of new presses and an ITEK platemaker.

--Automation of composition function.

--Acquisition of new bindery equipment.

--Continued work simplification.

NEXT STEPS FOR IMPROVEMENT

There is little potential for expansion of the data base because all the major printing operations within the government are included. There are however, a number of small of printing plants not presently included.

Productivity improvements for this function will probably be limited. Capital investment and automation have and will continue to improve productivity, but if output continues to decrease the favorable impact of these improvements will not be fully realized.

CHAPTER 18

PRODUCTIVITY TREND-GENERAL SUPPORT

NATURE AND SCOPE

This functional category includes many diverse elements which have been separated into the following three subfunctional areas:

Administrative
Finance
Personnel

A discussion of composition and productivity trends for each subfunctional area follows.

ADMINISTRATIVE

NATURE AND SCOPE

This category encompasses internal legal, administrative, computer, and administrative support type activities. The subfunction includes 17 organizational elements from 11 agencies and over 6,700 man-years as shown in Exhibit 18-1.

EXHIBIT 18-1

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Element	FY 1973 Man-Years	Number of Outputs	Output Example
Agriculture:			
Operations Mail and Support	57	7	Files classified
Civil Service Commission:			
Legal and Management Services	152	4	Payroll accounts maintained
Defense:			
Defense Communications:			
Commercial Office	212	1	Customer accounts administered
Computer Operation	238	1	Computer tasks reported
Engineering Office	115	1	Tasks accomplished
General Services Administration:			
Public Buildings Service:			
Space Management	400	3	Parcels acquired
Automated Data and Communications	3,082	3	Agency assistance actions
Interior:			
Office of the Solicitor	328	1	Weighted legal matters
Bureau of Mines:			
Automated Data Processing	105	1	Jobs processed
Justice:			
Administrative:			
Support Records Section	92	4	Files established
Library	19	3	Books prepared for use
State:			
Office of International Conferences	38	1	Conference participants serviced
Bureau of Public Affairs	42	5	Briefings made
Bureau of Administration	751	3	Weighted measure of services provided
Tennessee Valley Authority:			
Automatic Data Processing	90	1	Jobs processed
Treasury:			
Bureau of Public Debt:			
Automatic Data Processing	476	2	Securities processed
U.S. Information Agency:			
Administration	510	12	Employees payrolled
Total	6,707	53	

PRODUCTIVITY TREND

This subfunction experienced increasing output and nearly stable input, which resulted in significant productivity gains. Output gained over 47.6 percent in the period FY 1967-73, while input declined about 1 percent, with a resulting productivity increase of 49 percent. The productivity gain on an average annual basis amounts to 6.9 percent. The trends are shown in Exhibit 18-2.

EXHIBIT 18-2

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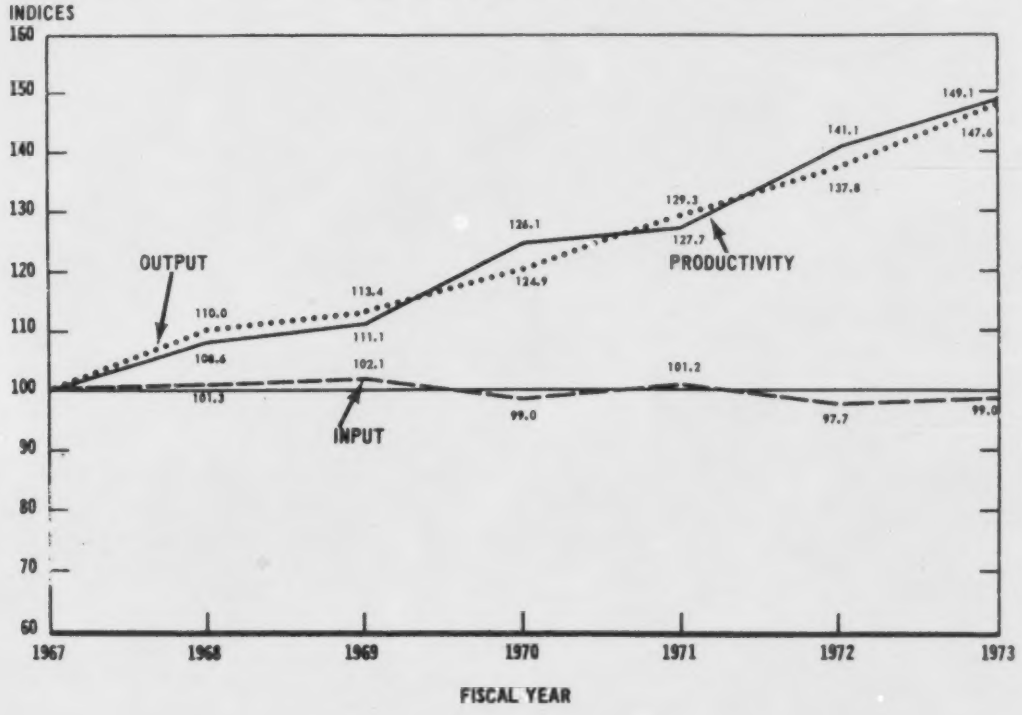
PRODUCTIVITY TREND
GENERAL SUPPORT- ADMINISTRATIVE



Since input remained stable, productivity followed output quite closely. It increased in two major jumps, one in FY 1970 and the other in FY 1972.

Of the 17 individual elements, 14 experienced productivity gains while three showed losses. Exhibit 18-3 shows these changes.

EXHIBIT 18-3

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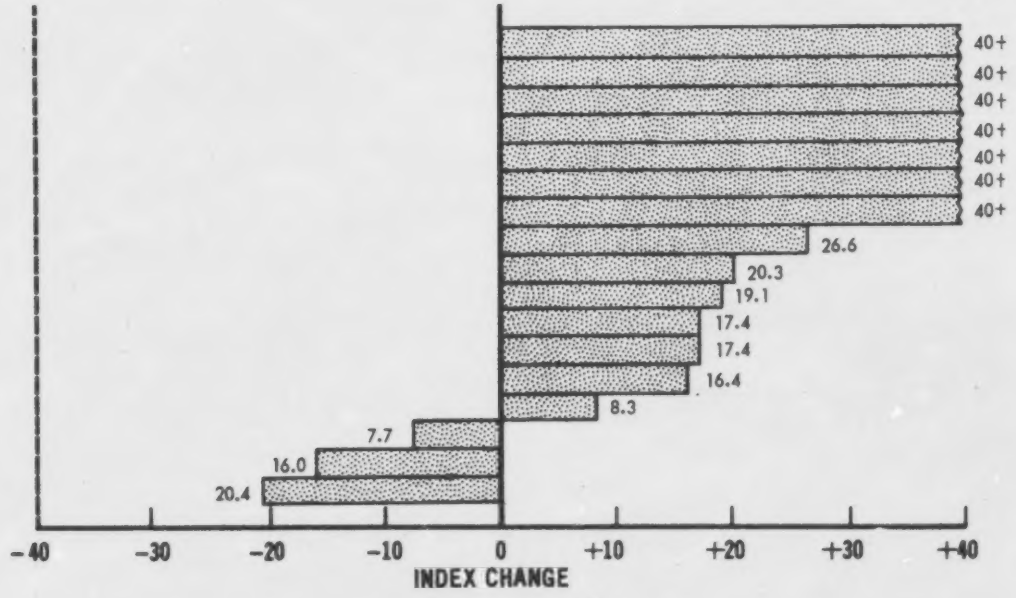
SIX YEAR ORGANIZATION PRODUCTIVITY CHANGES
GENERAL SUPPORT ADMINISTRATIVE
FY 1967 – 1973



FINANCE

NATURE AND SCOPE

This subfunction covers finance and accounting as well as audit type activities. It includes nine organizational elements from six agencies and covers over 8,000 man-years as shown in Exhibit 18-4.

EXHIBIT 18-4

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Agriculture:			
Office of Audit and Inspection	862	2	Complaint cases investigated
Defense:			
Navy:			
Finance Centers	3,206	5	Pay accounts maintained
Marine Corps:			
Finance Centers	653	7	Retired personnel accounts serviced
General Services Administration:			
Audit and Investigation	168	2	Audits conducted
Finance and Accounting Centers	641	3	Employees payrolled
Interior:			
Bureau of Mines:			
Finance	66	3	Vouchers examined
Justice:			
Administrative:			
Internal Audit	39	1	Audit reports issued
Treasury:			
Bureau of Accounts	1,464	3	Payroll savings bonds issued
Office of the Treasurer	998	7	Mutilated currency claims processed
Total	8,097	33	

PRODUCTIVITY TREND

Productivity of this subfunctional category increased to 110.5 in FY 1973 with the base year of FY 1967 as 100.0. Because input remained relatively stable, productivity followed the increase in output very closely. Productivity rose to 110.2 through FY 1971, then remained stable for the last two years of the period. Expressed as an average annual rate change, productivity growth was 1.7 percent. Index movements for the subfunction are shown graphically in Exhibit 18-5.

EXHIBIT 18-5

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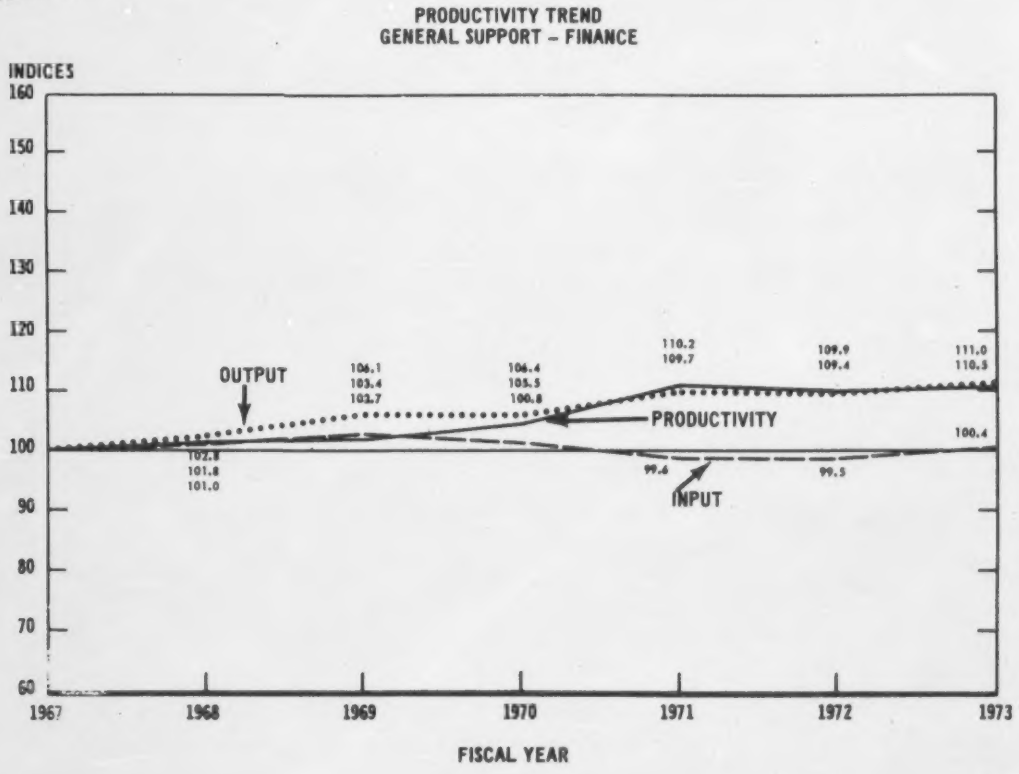
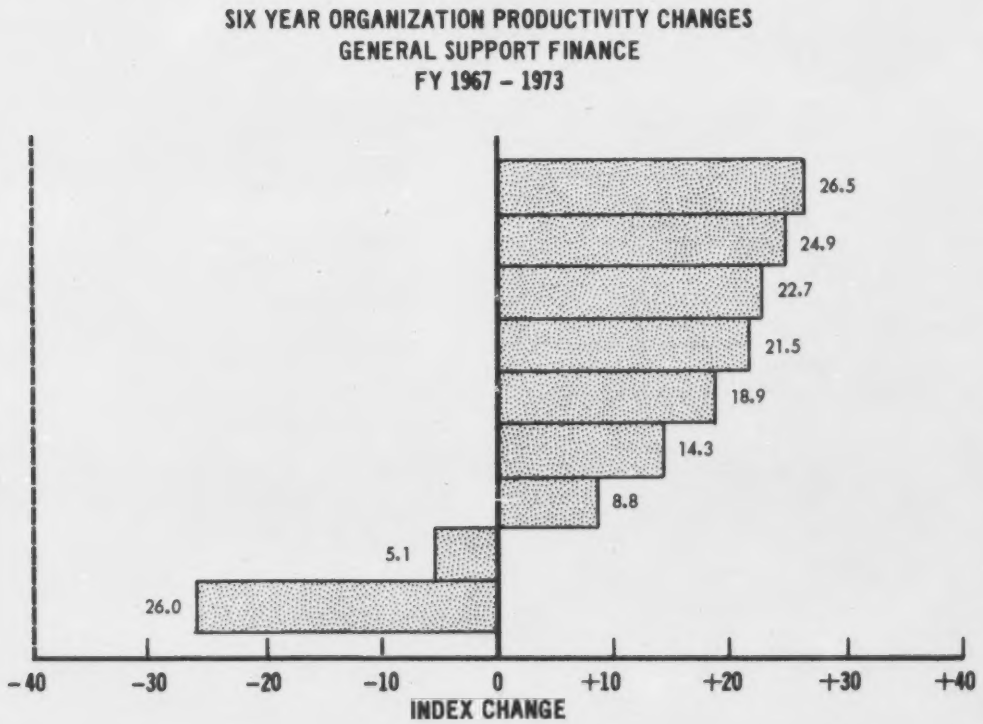


Six of the individual elements showed productivity gains in excess of the gain for the overall subfunction. One element showed a gain of less than the overall subfunction, while two elements showed declines. All seven elements showing productivity increases had significant output increases, while the two elements showing productivity declines had output declines. The trends are shown in Exhibit 18-6 below.

EXHIBIT 18-6



PERSONNEL

NATURE AND SCOPE

This subfunction includes personnel management and training functions within submitting agencies. It includes most of the man-years of the Civil Service Commission and a large element from the Department of the Army. The subfunction covers over 33,000 man-years through ten elements within five agencies. The data base for this subfunction is shown in Exhibit 18-7.

EXHIBIT 18-7

PARTICIPATING ORGANIZATIONS AND OUTPUT MEASURES

Agency and Elements	FY 1973 Man-Years	Number of Outputs	Output Example
Civil Service Commission:			
Retirement and Insurance	846	5	Retirement claims adjudicated
Fitness and Suitability	991	4	Suitability determinations made
Personnel and Management Improvement	873	4	Evaluations processed
Staffing-Federal Employment	2,092	5	Public inquiries answered
Strengthening State and local	230	2	Grant projects processed
Defense:			
Army:			
Base-Administration Personnel Support	27,882	1	Base population served
Defense Mapping School	198	1	Student man-years
General Services Administration:			
Personnel Service	376	4	Employment actions completed
Interior:			
Mines Personnel Management	77	1	Manpower service actions processed
Justice:			
Federal Bureau of Investigation:			
Training	400	1	Hours of instruction provided
Total	33,965	28	

PRODUCTIVITY TREND

The productivity gain for the six year period was 43.5 percent. Unlike most other functions, this gain was due to drastic cuts in input. In FY 1973, output was 2.5 percent above the base year level but input had declined to almost 30 percent below the base year level. Input and output rose through FY 1970, then input began dropping drastically. In terms of average annual gain, the six year productivity change is 6 percent. The trends are shown in Exhibit 18-8.

EXHIBIT 18-8

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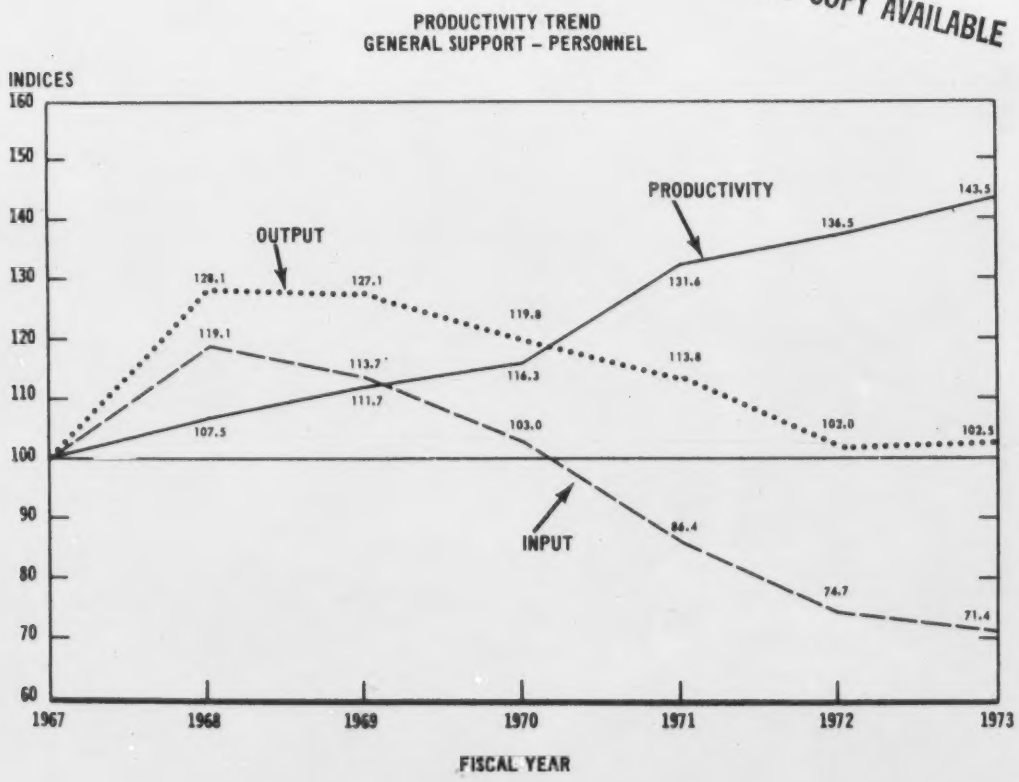
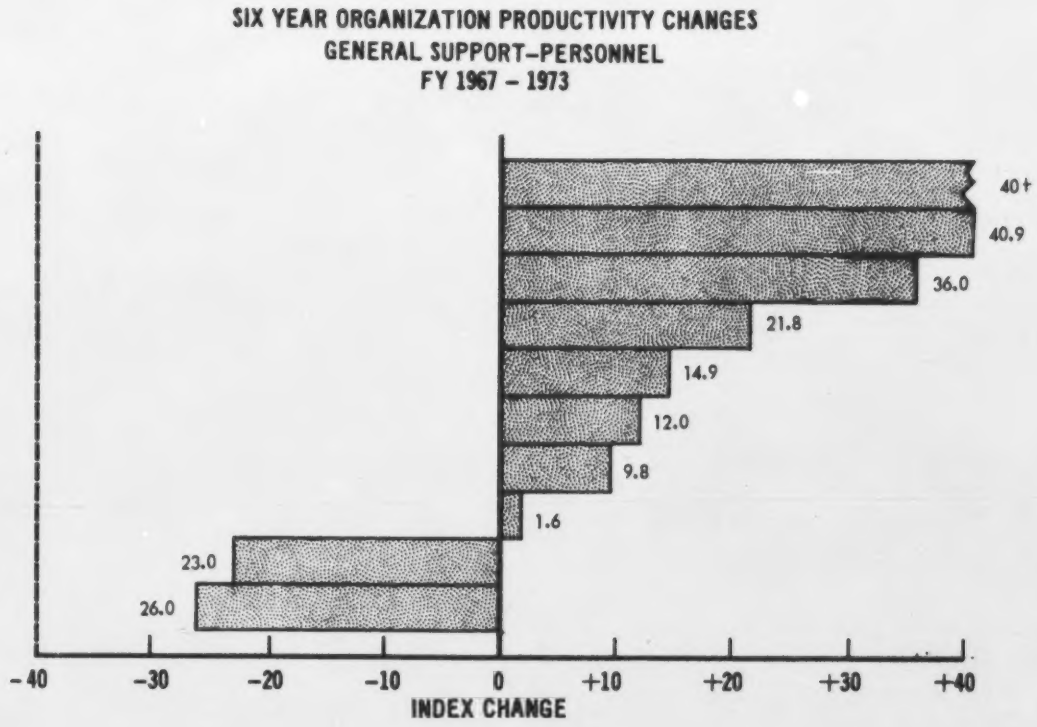


Analysis of productivity change by element shows eight which experienced gains, while two showed losses. Gains and losses covered a considerable range, from a decline of 26 percent to an increase of 52 percent. Exhibit 18-9 is a frequency distribution showing the productivity changes over the 6 year period.

EXHIBIT 18-9



ANALYSIS OF CAUSAL FACTORS

The major reasons given for productivity gains in the General Support areas were related to management actions. A number or organizational elements attributed gains to reorganization, while others gave the following reasons for increases:

--Simplified processing procedures.

--Improved forms design.

--Use of team concept, with resulting greater employee interest and involvement.

--Reduction in scope of work without impairment of product output.

--Emphasis on centralized product development has avoided duplication.

--Civilianization of military positions gives more stability and continuity in the workforce.

Some elements related gains to capital investment or automation. Examples of their actions are:

--Acquisition of word processing equipment increased production substantially.

--Acquisition of rotary files which yield easier access.

--Acquisition of magnetic card typewriters.

--Installation of automated telephone inquiry accounting systems.

--Installation of an ADP teletype terminal with the capability of connecting into time-sharing systems.

--Installation of automated equipment to handle annuity computation and maintenance of rolls reduced costs by 16 percent.

--Automation of contract payment and reporting system produced savings of 70 percent.

Elements within this functional category felt that the primary obstacle to productivity improvement was personnel problems. The following specific items were noted:

--High personnel turnover.

--Heavy travel requirements which make personnel difficult to hold.

--Grade reductions, requirements for hiring at lower grades, and lags in hiring.

Other obstacles cited were mostly increases in complexity of work product. Some elements cited increases in the number of steps or items per output and introduction of new programs as factors.

PREDICTION OF FUTURE TREND

Most elements believed that productivity would increase. Some reasons given for this increase were:

--Acquisition of improved data transmission equipment.

--Automation of the directory assistance function.

--Increased use of word processing centers.

--Capital investment in computer terminals.

--Automation of some parts of the personnel form processing workload.

--Use of computer microfilm to replace present paper output.

NEXT STEPS FOR IMPROVEMENT

At present this functional area contains a mixture of support type activities. During the next year efforts will be made to identify and develop separate indexes for discrete common subfunctions such as:

1. Auditing

2. Legal Services

3. Payroll and Accounting

4. Data Processing

This effort will require expansion of the data base to cover many support functional areas not presently included.

CHAPTER 19

PRODUCTIVITY TREND-GOVERNMENT-OWNED CONTRACTOR OPERATED ACTIVITIES

NATURE AND SCOPE

This function includes Government owned contractor operated (GOCO) plants of the Department of the Army and the Atomic Energy Commission. The employees covered by this functional category are not direct government employees and are not counted in the Federal employment data base.

The data base includes 14 of the 16 currently operating Army GOCO plants and the Atomic Energy Commission's weapons production facilities (eight weapons production plants.) The coverage totals 59,281 FY 1973 man-years from 22 GOCO plants measured through 272 output products. The specific activities are shown in Exhibit 19-1 below.

EXHIBIT 19-1

PARTICIPATING ORGANIZATIONS

Agency	Element	FY 1973 Man-Years
Defense	Lake City Plant	7,163
	Volunteer Plant	1,003
	Joilet Plant	1,996
	Twin Cities Plant	2,144
	Cornhusker Plant	1,279
	Longhorn Plant	1,126
	Louisiana Plant	1,344
	Radford Plant	4,190
	Kansas Plant	1,705
	Holston Plant	1,895
	Badger Plant	2,171
	Indiana Plant	2,948
	Milan Plant	3,572
	Lone Star Plant	4,336
Atomic Energy Commission	Weapons Production (8 plants)	22,409
Total		59,281

ARMY GOCO PLANTS

ANALYSIS OF CAUSAL FACTORS

The Army maintains a complex of sixteen Government owned contractor operated (GOCO industrial plants for manufacturing munitions. These plants having a combined replacement value of $9.0 billion, are grouped into four major categories: Manufacturing (propellants and explosives), Load, Assemble and Pack (LAP), Small Arms Manufacturing, and Metal Parts Fabrication. Management of the GOCO complex is assigned to the U.S. Army Armament Command, a major subcommand under the U.S. Army Materiel Command.

Throughout the Southeast Asia (SEA) effort, munitions production satisfied the customers' usage requirements. Ammunition support has been recognized as one of the great logistical accomplishments of the Vietnam conflict.

The Army has been successful in holding the line, or showing a downward trend, on cost of major items of munitions during the SEA operation, despite the national inflation. Significant accomplishments in productivity and related activities can be attributed to intensive management, an aggressive product improvement program, and capital investments.

Some typical examples of significant product improvements follow:

a. A hot-cup cold-draw process facility for 105MM HE projectiles was established during Korea, but never operated. The operation of this facility, during SEA, proved to produce the most economical and best quality projectile. This resulted in shut down of the hot forge method facilities and the cold extrustion facility. This reduced the cost from $13.03 in May 1945 (adjusted to today's dollars) to $7.80.

b. The spiral wrap cartridge case was re-engineered during the period between Korea and SEA from a five-piece to a three-piece construction. This new process requires considerably less facilities, reduced manpower requirements, and less material when compared to the draw case. This reduced the cost from $5.38 in May 1945 (adjusted to today's dollars) to $2.65.

PRODUCTIVITY TREND

Productivity at the end of FY 1973 was 137.2 based on FY 1967 as 100. The major portion of the gain occurred between FY 1970 and FY 1971 when the index moved from 103.9 to 124.4. The reasons were that the Army GOCO's experienced a significant decline in input compared to output while the AEC GOCO's increased significantly in output while increasing slightly in input. A chart of the input, output, and productivity indexes for the period FY 1967-FY 1973 is shown in Exhibit 19-2 below.

EXHIBIT 19-2

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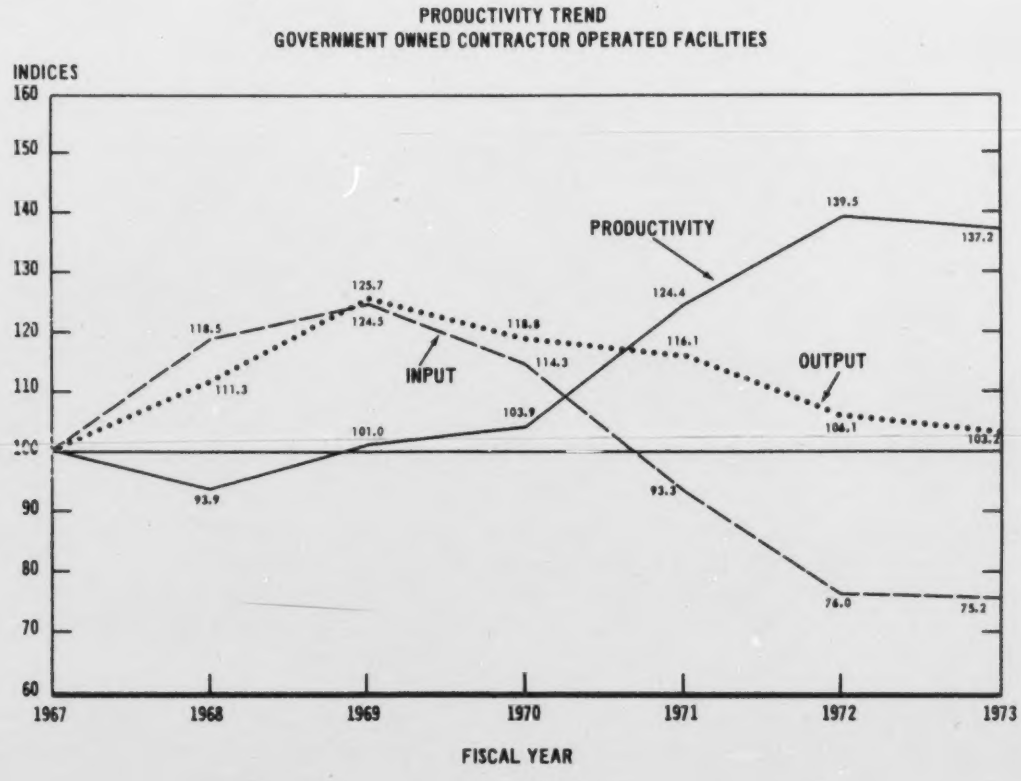

c. Mechanization of key operations, improved processes, and the establishment of industrial engineering standards, have significantly reduced the number of personnel in the LAP plants. This has reduced the cost of the 105MM HE complete round assembly from $31.37 in May 1945 (adjusted to today's dollars) to $23.00. Exhibit 19-3 gives some typical examples of improvements in modern type machines, improved processes and mechanization to reduce the number of operations:

EXHIBIT 19-3

EXAMPLES OF IMPROVEMENTS

Item	Operation	Before	After	% Reduction
155MM M107 Proj (Scranton AAP)	Nose Bore	12 Machines 6 Operators	3 Machines 3 Operators	50%
155MM M107 Proj (Scranton AAP)	Nick & Break	7 Operations 14 Operators	3 Operations 6 Operators	57%
155MM M107 Proj (Scranton AAP)	Forging	Manhandling 60 Operators	Auto Handling 40 Operators	33%
8" HE M106 Proj (Scranton AAP)	Rough Turn	26 Machines 21 Operators	16 Machines 9 Operators	57%
M2882 Primer (Lone Star AAP)	L/A/P	33,000 Units/Shift .01769 M.H./Unit	88,800 Units/Shift .01018 M.H./Unit	43%
M423-M427 Fuze (Louisiana AAP)	L/A/P	11,000 Units/Shift .0218 M.H./Unit	25,800 Units/Shift .0062 M.H./Unit	72%

The primary factors driving production cost down or holding them constant were:

a. The expenditure of capital funds through moderization programs and production support and equipment replacement projects.

b. Relatively large procurement programs.

c. Process and product improvement programs.

d. Value engineering programs.

E. Increased competition.

f. Increased management effectiveness.

The average price history for five selected high volume items for the peak SEA production period (FY 1966 thru FY 1971) is reflected below in Exhibit 19-4.

EXHIBIT 19-4

PRICE HISTORY-SELECTED COMPONENTS

Component (MPTS)	FY 1966	1967	1968	1969	1970	1971
M524 Mortar Fuze	$6.58	$6.58	$6.56	$6.36	$4.43	$3.45
M125 Booster	2.62	2.32	2.31	2.32	1.45	1.09
81MM Fin Ass'y	2.36	2.10	1.58	1.48	1.13	.97
105MM M1 Proj	8.58	8.38	8.13	9.74	7.11	7.05
105MM Cart Case	2.96	2.90	2.84	2.57	2.51	2.26

A study was conducted to determine historical cost indexes for the FY 1966-FY 1972 time frame. A sample of ten high dollar volume munition items was selected for this study. A total weighted relative cost was developed for each item and divided by the total percentage of the munitions budget for each year to arrive at the cost indexes. The results in historical cost indexes for conventional ammunition (using FY 1966-1968 as the base) are as follows:

FY 1966-FY 1968	1969	1970	1971	1972
1.00	.99	.86	.81	.79

A summary of significant accomplishments in the area of productivity and related activities follows:

a. Outstanding success in providing all types of munitions for US and allied forces in Southeast Asia.

b. The cost of munitions' items was reduced an average of 20% since 1965 despite national inflation.

c. Ammunition effectiveness was increased by an estimated 25% while overall cost was reduced.

d. A new worldwide ammunition reporting system (WARS) provided better stock status visibility.

e. An improved transportation management system controlled movement of parts between production facilities and movement of completed items from the production facility to overseas ports.

f. The most extensive production base modernization program since the start of World War II was initiated.

g. Aggressive program to improve existing ammunition items and develop new and advanced munitions.

h. A new ammunition support doctrine was developed for use in the field Army, along with the development of new tool sets and publication of improved technical manuals.

i. Continual improvement in the management of the GOCO production base.

j. Reduction in force from a peak of 29,000 to less than 18,000 - the lowest in the history of Army munitions.

AEC GOCO PLANTS

ANALYSIS OF CAUSAL FACTORS

Facility and equipment costs were unusally high during the FY 1967-FY 1973 period to provide capabilities for advanced weapons systems. The following tabulation (Exhibit 19-5) shows yearly costs for facilities and equipment.

EXHIBIT 19-5

FACILITIES AND EQUIPMENT COSTS
(In Million)

	FY 1967	FY 1968	FY 1969	FY 1970	FY 1971	FY 1972	FY 1973
Facilities	$16	$43	$120	$111	$58	$49	$52
Equipment	17	18	14	16	21	18	20
Total	$33	$61	$134	$127	$79	$67	$72

Facilities and plant improvement averaged $64 million a year and equipment averaged $18 million a year. A portion of the cost represents a continuing replacement and upgrading due to obsolescence, technological innovation, environmental and safety considerations, and economic benefits. Most of it, however, was to accommodate a new family of nuclear weapons including POSEIDON, MINUTEMAN III, LANCE, SRAM, SPRINT, AND SPARTAN.

PREDICTION OF FUTURE TREND

It is believed that, despite productivity improvement efforts, the expected significant reduction of future workloads could have an adverse impact on productivity. The plants will probably be operating significantly below capacity.

FUTURE PLANS FOR CONTRACTOR OPERATIONS

GOCO facilities are similar in many respects to direct government operations. For some agencies, such as AEC, major program activities are carried out in GOCO plants.

Any analysis of Federal productivity would be incomplete without attention to GOCO plants. An effort should be made to extend coverage to additional GOCO facilities of AEC, and other agencies, with particular emphasis on production-type activities.

Substantial parts of some Federal programs are conducted through other types of contractual arrangements. In many cases certain contractor-owned facilities are operated exclusively or primarily for Government programs. An attempt should be made to measure the productivity of each operation.

CHAPTER 20

RELATION OF PRODUCTIVITY MEASURES TO OTHER PERFORMANCE MEASURES

As has been pointed out throughout this report, reliance on productivity measures alone can result in misinterpretations and misconceptions about organizational performance. Since productivity measures imply nothing about the essentiality of the work being performed or the acceptable level of quality, concentration on the productivity aspects alone can result in actions detrimental to the accomplishment of program objectives and goals. In productivity measurement the output is taken as given. Thus an interest only in questions of productivity could result in efficiently carrying out the wrong functions. For example, if the goal of a program is to reduce crime, several activities may be chosen to achieve this goal. If one of the activities is to install improved lighting systems, productivity measures may show that lighting systems are being efficiently installed, but the improved system may have little or no impact on reducing crime.

Using an analogy between the private and public sectors, a business enterprise is judged successful when it makes a profit. Two conditions have to be satisfied for a business to make a profit. First, it has to produce products or services which people will buy. That means they have to choose effectively among the alternative goods to be produced. But that in itself is not enough. They also have to be able to produce efficiently, i.e., at a rate low enough to attract buyers and meet the competition. They cannot price themselves out of the market. Analogous problems, through perhaps more complicated, face Government programs. First, the Government program has to serve a public need, i.e., it has to be effective. And, secondly, it needs to be performed efficiently enough, i.e., at a cost which will justify its existence and provide for accomplishment of program workload.

QUALITY

Another aspect related to both effectiveness and efficiency is quality. What is meant by the term quality? It is important to clarify the meaning. In discussions with

Federal managers, it has been found that there are four different meanings attached to the word "quality" when applied to performance measurement.

1. Quality of the measurement data

This is concerned with whether the numerical measurements of input and output are reliable, i.e., whether they are obtained under adequate reporting criteria and subjected to reviews to assure their accuracy and consistency.

Suggested Approach

There should be periodic reviews of productivity measurement data, coupled with sample checking at the data source. In addition, when measurements trend sharply up or down, explanations should be sought.

2. Quality Specifications for the Output Product

This has to do with the scope of service or the characteristics of the output product. An example is the number of postal deliveries to be made by the Postal Service. If these are cut back from six to five per week, then the product quality specifications will be significantly changed downward. If GSA's standard has been to fill stores' requisitions in three days, and this is later changed to a two-day service, a substantial upgrading of quality specifications results.

Suggested Approach

The productivity index is adjusted to reflect the change in quality by changing the output weights to reflect the additional time required. The weights are changed in the year in which the quality change took place.

3. Program Effectiveness

Some people use the term "quality" to refer to the impact or public benefit of programs. This is a measure of how well an organization is achieving its goals and objectives, and goes beyond the measurement of productivity. A simple analogy may be used to distinguish between effectiveness and efficiency measurement. Efficiency is represented

by your automobile's odometer and gas guage; by relating the number of miles driven to the amount of gas consumed you can compute, after the fact, the well-known miles-per-gallon index. This "productivity type index" enables you to watch the trend in gasoline consumption and to take steps to obtain more miles per gallon. Efficiency can have an impact on effectiveness; effectiveness has to do with such matters as whether your automobile performs reliably, drives comfortably, and gets you to your destination.

Suggested Approach

This universe of measurement requires a methodology which can provide insights into how well a program is attaining its objectives. While the approaches to the measurement of program effectiveness vary in scope and detail, a system of "Management by Objectives" provides a structure for the quantification of objectives and some provisions for holding managers accountable for results.

4. Quality Control of the Output Product

This has to do with the procedures employed to assure that the product meets the specifications promised to the user. An example would be the inspection techniques (both human and mechanical) applied to newly-printed currency, stamps, and bonds by the Bureau of Engraving and Printing to screen out imperfect products. This may be the most important aspect of quality required to assure that the integrity of productivity measurement is maintained. Every well-managed organization should have a formal quality control system. They can range from such simple techniques as proofreaders in a publications operation, to sophisticated statistical sampling and testing programs in a manufacturing organization.

Suggested Approach

Statistical quality control procedures are used to determine if quality is out of control. This is the most common use of the term quality measurement.

QUALITY MEASUREMENT WORKSHOP

In order to learn what organizations were doing to measure quality of the output product and to provide for an interchange

of ideas on the subject, the Joint Financial Management Improvement Program (JFMIP) conducted a quality measurement workshop in December, 1973. Two private companies--Government Employees Insurance Company (GEICO) and the American Telephone and Telegraph Company (AT&T)--and three Federal agencies--Veterans Administration (VA), Social Security Administration (SSA) and the Postal Service--made presentations on their approach to quality measurement.[1]

GEICO, an insurance company, has a comprehensive quality measurement system tied into all processing aspects of its work. The GEICO staff uses such techniques as audit checks, policyholder complaints and closed loop sampling plans. Employee performance and resulting bonuses are tied to quality as well as productivity measures.

The Department of Veterans Benefits of VA introduced a statistical quality control system in the early 1960's. The system measures such characteristics as accuracy, compliance and timeliness. Each characteristic has an acceptable and unacceptable statistical level. Control limit graphs are developed to aid supervisors in determining whether a process is or is not in a state of statistical control.

The Retirement and Survivors Insurance Bureau of SSA has a quality appraisal staff which is responsible for all quality activities in the Bureau. This staff collects data, on a sampling basis, on accuracy of results by type, origin, and significance, processing times and timeliness. The field quality appraisal staffs collect the data and send it to central offices for analysis and development of management reports. They supplement this system with monitoring visits and exchange reviews between one regional appraisal staff and another.

AT&T has quality of service measurement broken into three areas: (1) procedures (dial for speed, equipment blockages and equipment), (2) accuracy (service orders, rates and reading bills), and (3) promptness (percent measured opportunities,

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[1]For more detailed information on these programs see the "Proceedings of the Quality Measurement Workshop," December 1973.

percent trouble reports, and percent of speed of answer over 10 seconds). The sampling is performed by an independent outside research firm which samples all contacts between customer and AT&T by use of a telephone service attitude measurement interview. They measure over 75 events on a regular basis.

The Postal Service has developed an Origin-Destination Information System (ODIS) that provides an overall measure of service (from day of postmark to day of intended delivery). The ODIS reports show daily volume and response time. Standards of performance are established from one area to another. ODIS measures service between the postmark data and the time of arrival and this is compared to the standard for that origin-destination.

The importance of measuring quality along the lines of the above mentioned programs has been brought out repeatedly in the analysis of productivity change. One of the most frequent reasons given for changes in productivity indexes is quality change. Without measures of quality, management has no way of knowing the extent to which quality is changing in relation to changes in productivity. Measures of quality put management in a position to assess total performance and make objective decisions concerning trade-offs between quality and productivity. Several cases have been identified where quality was dropping as productivity indexes increased. Management must know this in order to make appropriate adjustments.

This discussion of the relationship between different aspects of performance measurement underscores the importance of developing a total measurement system consisting of productivity, effectiveness and quality measures. It is important that all measures of performance be developed and integrated into a total measurement system with carefully defined uses of each measurement for all levels of management.

JFMIP plans to work with several agencies during the coming year in the design of total measurement systems. Work is already underway in the Region IX Office of HUD. In addition, the Army Materiel Command has established a measurement system which combines measures of efficiency with effectiveness. (A detailed description of the Army system is contained in Volume II, Chapter 3 of this report.

MANAGEMENT BY OBJECTIVES

One final aspect of measurement which has caused some confusion is the relationship between a "Management by Objectives" (MBO) system and productivity measurement. In essence, an MBO system:

(1) Identifies and defines specific end objectives,

(2) Specifies activities or programs which contribute to those objectives.

(3) Relates resources to those activities or programs,

(4) States objectives, activities, and resources in measurable terms so they can be evaluated,

(5) Establishes a reporting system for feedback,

(6) Compares achievements with objectives, evaluates, and adjusts activities or programs accordingly.

An MBO system provides a structure to evaluate total performance. Productivity measurement can be used to evaluate those objectives concerned with efficiency of operation. For example, the work in the Region IX HUD Office ties measures of effectiveness and efficiency into an overall MBO system by established objectives than can be evaluated in terms of the measures of productivity and effectiveness now being developed. In addition, the Department of Defense, as part of its MBO program, is establishing an objective directly concerned with productivity improvement. It states:

> "Increase labor productivity measurement coverage for DOD support functions so that 50 percent coverage is achieved in FY 1975. Initiate actions which will result in achievement of labor productivity increases of 1.7 percent in the measured areas in FY 1975."

There are other agencies that have also submitted objectives concerned with productivity.

In summary MBO provides an effective structure to tie together all aspects of performance measurement. Now that a good base for productivity measurement has been developed, emphasis should be placed on developing measures of quality and effectiveness and relating them in a total system that is useful to management.

CHAPTER 21

COOPERATION WITH STATE AND LOCAL GOVERNMENTS

INTRODUCTION

As the Federal efforts began to show results in measuring and enhancing productivity at the Federal level, it became apparent that many of the techniques and methods could be applied equally as well to state and local government operations.

There is an astounding degree of variation in the level, quality, and cost of many public services from one jurisdiction to another. Reports from the Urban Institute show that some cities outperform others of comparable size by as much as 1,000 percent. As one illustration of the variations in service that occur, one city collected solid waste at the rate of 908 tons per man, but another city of approximately the same size just 30 miles away collected only 334 tons per man. Similar variations were reported in other service areas. This points to the tremendous potential that exists for service improvements and cost savings in all localities.

With the Federal Government investment at the State and local levels increasing about 15 percent a year and with Federal funds accounting for more than 22 percent of the total revenues of all State and local governments, it is obvious why the Federal Government should have an interest in productivity as it affects State and local governments.

During the past year, the Joint Financial Management Improvement Program (JFMIP) has provided limited technical assistance to State and local governments interested in implementing productivity improvement programs. Most of this work has been done in cooperation with the National Commission on Productivity (NCOP) and the International City Management Association (ICMA). NCOP has played an especially strong leadership role in generating interest in public service productivity improvement.

The following is a summary of the specific state and local government activities which the JFMIP participated in during the past year.

ICMA TWO-CITY PRODUCTIVITY IMPROVEMENT PROJECT

In March 1973, the NCOP, in conjunction with ICMA and the JFMIP, initiated productivity assessment pilot projects in St. Petersburg, Florida, and Nashville/Davidson County, Tennessee. The objective of this effort is to introduce the concept of productivity measurement and its use in management decisions. The emphasis is on demonstrating productivity improvement first and productivity measurement second.

The procedures followed in both cities are essentially to (a) identify service areas that will yield the greatest payoff from an improvement effort; (b) develop initial productivity measures; (c) collect data to establish a base point against which eventual improvement may be measured; (d) develop and initiate a productivity improvement program; (e) collect data and evaluate the program, as well as the measures; and (f) institutionalize the process.

The use of measurements differs in the two cities. In St. Petersburg the efforts are aimed at establishing measures for the entire service areas (e.g., fire, sewer, transit, parks, and street maintenance, and residential refuse collection) and providing for regular collection and analysis of data. This has already had an impact on improvement actions. The Sanitation Department is using new equipment and making changes in collection routes to reduce labor requirements; the Department is converting from three to two man crews, and in some cases one man crews. The Parks Department is analyzing its maintenance workload to better schedule its manpower.

In Nashville, measures will be developed within service areas (street and parks maintenance and water and sewers) but designed to help evaluate specific improvement efforts (e.g., street patch crew scheduling, water meter repairs and routing and park maintenance techniques).

One of the key aspects of the projects in both cities is the development of available analytical talent. A dual approach has been undertaken: first, to build in-house staff capability, either through training or hiring new personnel, and, second, to seek the assistance of outside expertise, such as the JFMIP team, local universities and business, or local professional groups.

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JFMIP became involved in the St. Petersburg project shortly after it began. A member of the GAO staff worked several weeks on the project under an intergovernmental exchange program. Also, arrangements were made for the ICMA project leader to meet with Federal agency personnel concerning application of Federal expertise in areas under study in St. Petersburg (Navy Department-road and grounds maintenance, National Park Service-park maintenance). The JFMIP team also conducted a performance assessment survey of the Sanitation Department on a test basis. This survey technique is a checklist approach to assess management's performance and determine where improvement is needed. An important element of the survey is evaluating all information available to management in order to gauge performance. Finally, in May 1974 JFMIP arranged for the U.S. Army Management Engineering Training Agency to conduct a training course on "Management Methods and Techniques" for the city management staff. If successful, this training program can serve as a model for other localities.

In Nashville, a GAO auditor was assigned to work for three months with a project team in the Water and Sewer Department. This project team analyzed the routing of water meter readers and studied alternatives for a water meter replacement program. They found that by consolidating and changing routes, and by putting meter readers on a task system, a 22 percent savings in manpower could be realized. In the changeover study for replacing the city's antiquated water meters, an alternative was recommended that should net the city $800,000 in savings over the next fifteen years by increasing water revenues and reducing maintenance and repair costs. This project underscored the importance of developing analytical talent at the local level in order to respond to the multitude of problems facing local management. (See Volume II, Chapter 16, for a complete description of this project.)

Another integral part of the work in the two cities is an attempt to measure citizen-related impacts of service, as well as workload. A comprehensive citizen survey was conducted in St. Petersburg. The survey was conducted by the Urban Institute and Suncoast Opinion Surveys. Its major purpose was to ascertain and present information to city legislators and administrators on citizen attitudes toward, and perceptions of, the quality of several services provided them by municipal government. Areas explored ranged

from vital government functions such as police protection and sanitation services to the provision of downtown parking and library facilities. The survey proved to be a valuable tool in identifying problem areas, the level of quality of service being provided, and the utilization level of service.

A follow-up survey will be made to determine effectiveness of particular programs, changes in the nature and attitudes of the population, and to provide trend information for both administrators and legislators. This same approach will also be used in Nashville.

Reports on the Nashville and St. Petersburg projects will be issued to provide guidance to other cities interested in initiating productivity improvement efforts.

GAO/OMB SYMPOSIUM ON FEDERAL TECHNICAL ASSISTANCE

In April 1974, the General Accounting Office and the Office of Management and Budget jointly sponsored a symposium on Federal technical assistance to State and local governments. Representatives from 10 agencies were invited to attend and present their approaches to technical assistance. The intent of the meeting was to obtain a clearer understanding of the types of Federal technical assistance provided, to identify the recipients of such assistance, and to discuss the impacts of technical assistance on the procedures and performance of State and local government.

There were several impressive examples of assistance efforts as reported by agencies:

--HEW is working on programs to help chief executives of State and local governments improve their capabilities to plan and manage human service programs, including related information and communication technology.

--DOT is stressing assistance aimed at upgrading technical and planning capabilities at State and local levels through a comprehensive technology sharing program.

--HEW is testing new methods of building the analytic capabilities of local governments, including information systems and effectiveness measures. Through the Urban Observatory Program in 10 cities, it is attempting to tie together the research and analytical capabilities of universities and local governments.

--NSF has a variety of programs aimed at aiding State and local governments to increase their capability to employ science and technology. One of the principal instrumentalities utilized is a non-profit organization known as Public Technology, Inc.

--CSC, through the Intergovernmental Personnel Act, provides technical assistance in personnel management; grants to states and local government for personnel management improvement; training and government service fellowships; and a mobility program providing for the interchange of personnel among Federal, State, and local governments and universities.

At this conference the importance of understanding the administrative environment of State and local governments was stressed, as well as their understanding of the Federal environment so trust and confidence could be generated.

In the general discussion of the presentations four main issues were raised:

--The extent of present interagency cooperation in technical assistance for State and local government, and factors inhibiting cooperation.

--What technical assistance means, and whether present technical assistance programs are effective.

--The role of State and local officials in improving Federal technical assistance.

--Action to be taken to improve Federal policy for the provision of technical assistance.

To follow up on these issues, an interagency steering committee on Federal technical assistance to State and local governments will be established shortly. The resolution of these types of issues will have an impact on future

directions of assistance on productivity improvement to local government levels.

OTHER ACTIVITIES

During the past year several presentations have been made to State, county, and local government managers who are interested in launching productivity improvement programs. In addition, technical assistance has been provided to Nassau County, New York. The Department of Labor and NCOP are sponsoring a project in Nassau County on productivity measurement as it affects labor and unions, particularly, in the collective bargaining process. Productivity improvement studies are being conducted in four activities: a hospital emergency room, a probation department, a purchasing department, and a road maintenance department. The project team is developing and testing a mathematical model to analyze both effectiveness and efficiency of performance. If proven successful, the model would then be used in the collective bargaining process. JFMIP has been providing technical assistance in the construction of the model.

CONCLUSIONS

In the past year much has been learned about State and local government operations. The studies in productivity have provided a better understanding of what is being done at the local level and have indicated that there are basically three problems in achieving productivity improvement at the local level:

--Local governments need more analytical capability to help resolve operating problems.

--Governments generally penalize bad performance but do not provide strong enough incentives for good performance.

--There is a lack of objective measurement of achievements and performance available to the manager.

The following are possible areas for future follow-up action in State and local government activities:

(1) Develop and collect national data on local government productivity by function, in cooperation with BLS and ICMA.

(2) Assist ICMA in designing training workshops throughout the country on how to initiate and conduct productivity improvement programs.

CHAPTER 22

CONCLUSIONS

Much progress has been made in the last few years in the measurement and enhancement of productivity in the Federal Government. It has clearly been demonstrated that it is possible to measure the productivity of large segments of the Federal workforce. The overall productivity of the measured sample has increased over the last 6 years, and some functions have made very impressive gains.

Despite this progress, much remains to be done. There are many challenging opportunities for further advancements in the use of productivity measurement in the Federal Government.

The objectives of future Federal productivity efforts may be summarized as follows:

A. Encourage greater use of productivity measures in conjunction with other measures of performance and quality in the budget and general management processes.

B. Continue and improve the basic productivity measurement program.

C. Learn more about the factors causing productivity change and possible corrective actions.

D. Expand coverage of the measurement system.

E. Inform Government officials, members of Congress, and the public about the productivity improvement program.

F. Share the knowledge gained in the Federal program with officials of State and local governments.

The remainder of this chapter is devoted to discussion of these objectives and the efforts that are underway or planned toward their achievement.

A. MANAGEMENT USE OF PRODUCTIVITY MEASURES

Perhaps the greatest challenge for the next year is to find and apply ways to use productivity measures in conjunction with other measures of performance and quality as an effective part of the management process. This report contains several examples of organizations which are making productivity measurement an integral part of their management processes. As indicated in Chapter 20, several organizations (e.g., Social Security Administration, Postal Service, and Army Materiel Command) have begun interesting work in assessing the relation of productivity measures to other measures of performance or product quality. The JFMIP staff has been cooperating with the Western Regional Office of the Department of Housing and Urban Development on development and use of a total measurement system which combines productivity measurement with other measures of program performance. These experimental efforts should continue and be expanded. Other organizations will be actively encouraged to undertake similar efforts. In addition to technical consulation, there will be an organized approach to the sharing of experiences and opportunity for cross-fertilization of ideas among agencies.

It has been recognized that one of the greatest potential areas for use of productivity data is in the area of resource allocation and budgets. It has also been recognized that some of the agencies' experiences with use of productivity data in the budget process have not been entirely satisfactory. Attention will be given to ways to use productivity data in improving budget and manpower planning processes. It is important, also, that individual agencies, with technical assistance from the central groups, explore fully the opportunities for:

--Using productivity data in preparing and justifying budgets.

--Using productivity data in evaluating performance against approved operating budgets.

--Adjusting their budget systems to permit more effective and timely use of funds for productivity investments.

B. IMPROVEMENT OF THE SYSTEM

A number of agencies have identified the need to develop better ways of measuring their output. For example, there are cases where product complexity and quality changes have a significant effect on the output indexes. A more detailed breakdown of output indicators may help in such cases. Technical consultation will be provided agencies which are prepared to explore problems of this type.

It has been recognized that some of the output measures which have been used, for example, population served or square feet of space, are surrogates and that there should be active efforts to develop more meaningful output indicators. An effective approach to this type of problem might be to establish interagency study groups or make a special assignment to one central agency to undertake research in a particular area. Such study should include analysis of available performance standards and experiences of other organizations, industrial as well as governmental. An effort such as this might not only lead to better output indicators, but it might lead to a greater standardization of both work standards and output indicators among agencies.

Attention will also be given to developing better systems for collecting both input and output data. Wherever possible, data collection systems should be tied to cost accounting and other management systems already in use.

C. CAUSAL FACTORS AND CORRECTIVE ACTIONS

Analysis of causal factors continues to be a most important part of the productivity review. Only in this way can managers gain an understanding of the input, output, and productivity trends for their operations. Such an understanding is essential if proper operational and management changes are to be made, and if the trends are to be useful in planning future operations.

Capital investment and automation have been the most frequently cited reasons for productivity gains. On the other hand, the problems of obtaining capital funds on a timely basis have been cited as major deterrents to further productivity improvements.

The current GSA study of capital investment was discussed in chapter 1. This project will be completed early in FY 1975. A report will then be prepared and appropriate follow-up action will be taken. A series of interagency workshops will be conducted to deal with such topics as capital investment financing techniques, approaches used to identify capital investment opportunities, economic evaluation of capital investment, and post audits of capital investment.

In addition, GSA plans to establish a clearinghouse for the collection and dissemination of agency publications pertaining to capital investment programs and work productivity measurement systems.

The causal factors for productivity change include many factors related to personnel management. The Civil Service Commission has begun a major long-range research and demonstration program to examine new approaches in the personnel management field. In cooperation with a number of Federal agencies, it plans to launch a carefully measured study of the effect on organizational productivity of such behavorial science approaches as participative management, organization development, job enrichment, flexible work hours, and revised incentive systems. It will also test the feasibility of relating indicators of personnel management effectiveness to an organization's productivity measures.

Representatives of several organizations have said that their productivity has been affected significantly by practices of contracting out portions of their work. There is need for a careful study of the impact of contracting out practices on productivity and on the overall cost effectiveness of certain operations such as printing activities.

D. EXPAND COVERAGE

There are several ways that coverage of the productivity measurement system can be expanded. Special attention will be given to agencies which have not submitted productivity data for any of their employees or have submitted data for only a relatively small portion of their employees. It is recognized that much of the work by these agencies is not

readily susceptible to measurement. On the other hand, there are other agencies with similar functions who have found ways to measure their productivity. A sharing of experiences can be helpful.

There are several areas of work common to a number of Federal agencies for which there presently is very limited coverage. This includes such areas as automatic data processing, laundries, and libraries. Preliminary work has been started with the Federal Library Committee, and it is hoped that a number of additional libraries will submit productivity data for the next report. Since most agencies now have substantial ADP operations, it should be possible to achieve a substantial expansion of coverage of this area.

In some other functional areas, there already is quite good coverage but there still may be opportunities for substantial expansion and improvement. Among these areas are maintenance, education, and training. A sharing of experiences among agencies will be helpful here.

Some agencies are taking management action to improve coverage. The Department of Defense, for example, is incorporating specific objectives for increasing coverage of productivity measures in its goals under the Management by Objectives Program.

This year for the first time there was limited coverage on overhaul of ships at Navy Shipyards. This came about only after intensive efforts by the JFMIP and Navy staffs to test a variety of measurement systems. This work will continue and it is hoped that it will be possible to provide coverage for a larger portion of the shipyard activity in the next report.

This report includes productivity data for 14 GOCO contractors of the Army and 8 GOCO contractors of AEC. These contractors perform activities very similar to activities performed by direct Federal employees. In many cases the nature of the work is such that it lends itself quite readily to productiviy measurement. There will be efforts to expand the coverage by identifying other types of Government contractors for which meaningful productivity data can be supplied. There are a number of contractors who, although they

use their own facilities, devote all or a substantial part of those facilities to the performance of government work. It would be very useful to measure the productivity of such operations.

E. INFORMATION PROGRAM

The staffs of GSA, BLS, CSC, and JFMIP are available to work with staffs of the various operating agencies to provide information and technical assistance in the development of agency productivity programs. Information will also be available through the Civil Service Commission Clearinghouse on Productivity and Organizational Effectiveness and the planned GSA clearinghouse for information on capital investment programs and work productivity measurement systems.

Seminars or workshops will be conducted in Washington and in various regions to help disseminate useful information on productivity measurement and to share the experiences of the various agencies.

It is important that the concept and results of the productivity program be understood as widely as possible throughout the Federal Government and among the general public. Wide dissemination of this report should be helpful. Special reports may also be issued from time to time. In addition, there will be special briefings and other presentations to interested groups.

F. COOPERATION WITH STATE AND LOCAL GOVERNMENTS

Continuing working relationships will be maintained with the National Commission on Productivity, the International City Management Association, and other organizations concerned with State and local government productivity. Technical assistance will be provided to ICMA in designing training workshops throughout the country on how to initiate and conduct productivity improvement programs and how to disseminate results of productivity work. Consideration will also be given to the feasibility of developing a program for collecting national data on local government productivity by function.

APPENDIX I

PARTICIPATING ORGANIZATIONAL

ELEMENTS BY AGENCY

1. DEPARTMENT OF AGRICULTURE:
    - Marketing Service
    - Stabilization and Conservation Service:
        - Farmers Home Administration
        - National Agricultural Library
        - Office of Inspector General, Audits and Investigations
    - Office of Operations:
        - Mail and Support
        - Printing
    - Packers and Stockyards Administration
    - Statistical Reporting Service
    - Soil Conservation Service
    - Animal and Plant Health Inspection Service:
        - Meat and Poultry
        - Veterinary Services
        - Plant Protection and Quarantine
    - Forest Service:
        - Timber Management
        - Recreational Public Use

2. DEPARTMENT OF COMMERCE:
    - Bureau of Census, Personal Census Service Branch
    - Economic Development Administration, Public Works Projects
    - Maritime Administration, Reserve Fleet
    - National Oceanic and Atmospheric Administration:
        - National Ocean Survey
        - National Weather Service
    - National Technical Information Service Order Processing
    - Patent Office

3. DEPARTMENT OF DEFENSE:
    - Department of the Air Force:
        - Logistics Command:
            - Maintenance Air Materiel Area
            - Procurement and Supply
            - Printing Plants
        - Hospitals

Department of the Army:
- Materiel Command Depot Maintenance Base:
  - Administration
  - Maintenance and Repair of Real Property
  - Operations, Personnel Support
  - Operations, Utilities
  - Other Engineering Support
  - Services
  - Supply Operations
  - Central Procurement Activities
  - Maintenance of Material
  - Overseas Education of Dependents
  - Patient Care
  - Supply Depot Operations
  - Supply Management Operations
  - Printing

Department of the Navy:
- Bureau of Medicine and Surgery
- Marine Corps Finance Center
- Aircraft Rework Facilities
- Finance Centers and Offices
- Ordnance activities
- Navy Supply Centers
- Navy Supply:
  - Inventory control points
  - Publications and printing services
- Public Works Centers
- Marine Corps Supply Centers

Defense Supply Agency:
- Total agency

Other Defense Agency:
- Defense Communications:
  - Commercial Office
  - Engineering Office
  - Computer Operations
- Defense Mapping:
  - Production Centers
  - School

4. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE:
- Food and Drug Administration
- Health Services and Mental Health Administration:
  - Indian Health Service
  - Federal health programs, Hospitals and clinics

National Institutes of Health:
Bureau of Health Manpower Education
Library of Medicine, Library Services
Printing and Reproduction Branch
Research support, Grants and contracts
National Institute of Mental Health, Grants and contracts
Office of Education, Aid programs
Printing Plant
Social Security Administration

5. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT:
Equal Opportunity
Housing Production and Mortgage Credit
Printing Plant

6. DEPARTMENT OF THE INTERIOR:
Alaska Power Administration
Bureau of Indian Affairs
Bonneville Power Administration
Bureau of Land Management:
Cadastral surveys
Forage production
Timber production
Bureau of Mines:
Automatic data processing
Division of finance
Helium conservation
Personnel management
Procurement, property and record management
Bureau of Reclamation, Total agency
Geological Survey, Map reproduction
Geological Survey Topographic division
Office of the Solicitor
Printing Plant
Southeastern Power Administration
Southwestern Power Administration
Sport Fisheries and Wildlife, fish hatcheries
Mine Enforcement and Safety Administration:
Pittsburg
Metal and Non Metal

7. DEPARTMENT OF JUSTICE:
Bureau of Prisons
Board of Parole

Civil Division
Criminal Division
Federal Bureau of Investigation:
    Crime and Science Laboratory
    Identification by Fingerprints
    Maintenance of Investigative Records
    Training
Immigration and Naturalization Service
Marshalls Service, Prisoner Movement
Tax Division
Administration:
    Support Services
    Library
    Internal Aduit

8. DEPARTMENT OF LABOR:
    Reproduction and Printing
    Bureau of Labor Statistics
    Employment Standards Administration
    Manpower Administration
    Occupational Health and Safety

9. DEPARTMENT OF STATE:
    Bureau of:
        Administration, partial
        Public Affairs, partial
        Security and Consular Affairs
    Office of International Conferences

10. DEPARTMENT OF TRANSPORTATION:
    Federal Aviation Administration
    Saint Lawrence Seaway Development Corporation
    Coast Guard

11. DEPARTMENT OF TREASURY:
    Bureau of:
        Accounts
        Alcohol, Tobacco, and Firearms, Regulatory
          Enforcement
        Customs:
            Processing cargo
            Processing mail
            Processing persons
        Engraving and Printing
        Mint, Coinage Activities and Depositories

Public Debt, Data processing activity, Parkersburg Office
Public Debt, Other Treasury Securities
Public Debt, Savings Bonds and Notes
Comptroller of the Currency
Internal Revenue Service
Office of the Treasurer of the United States

12. ATOMIC ENERGY COMMISSION:
Technical Information Center (Oak Ridge)

13. CANAL ZONE:
Panama Canal Company:
Printing Plant
Overall Agency

14. CIVIL AERONAUTICS BOARD:
Audits, reports, and customer complaints

15. CIVIL RIGHTS COMMISSION:
Total agency

16. CIVIL SERVICE COMMISSION:
Fitness and Suitability Assurance
Legal and Management Service
Personnel and Management Improvement
Printing
Retirement and Insurance Program
Staffing Federal Employment
Strengthing State and Local Personnel

17. OFFICE OF ECONOMIC OPPORTUNITY:
Total agency

18. ENVIRONMENTAL PROTECTION AGENCY:
Measurable activity

19. FARM CREDIT ADMINISTRATION:
Examination division

20. FEDERAL COMMUNICATIONS COMMISSION:
Printing and Reproduction Plant
Safety and Special Radio Services
Chief Engineer

Common Carrier
Field Engineering

21. FEDERAL HOME LOAN BANK BOARD
Total agency

22. FEDERAL MARITIME COMMISSION:
Total agency

23. FEDERAL MEDIATION AND CONCILIATION SERVICE:
Mediation of labor-management disputes

24. FEDERAL POWER COMMISSION:
Total agency

25. FEDERAL TRADE COMMISSION:
Total agency

25. GENERAL ACCOUNTING OFFICE
Printing plant
Transportation and Claims Division

27. GENERAL SERVICES ADMINISTRATION:
Federal Supply Service:
Inspection
Procurement
Supply Control
Supply Distribution
Supply Standardization
National Archives and Records Service
Personnel Services
Office of Audits and Investigations, Administration
Office of Finance, Accounting Centers
Public Building Service:
Buildings Management
Office of Space Management
Transportation and Communications Service

28. GOVERNMENT PRINTING OFFICE:
Production Department
Public Documents Department
Printing Procurement

29. INTERSTATE COMMERCE COMMISSION:
    Compliance
    Regulation, carrier rates, practices, operational authority and finance
    Supervision and analysis, carrier accounting statistics
    Supervision and interpretation of tariffs

30. NATIONAL AERONAUTICS AND SPACE ADMINISTRATION:
    Langley Research Center printing plant

31. NATIONAL CREDIT UNION ADMINISTRATION:
    Total agency

32. NATIONAL FOUNDATION ON THE ARTS AND THE HUMANITIES:
    Total agency

33. NATIONAL LABOR RELATIONS BOARD:
    Total agency

34. NATIONAL SCIENCE FOUNDATION:
    Total agency

35. NATIONAL TRANSPORTATION SAFETY BOARD:
    Total agency

36. U.S. POSTAL SERVICE:
    Total agency

37. RAILROAD RETIREMENT BOARD:
    Total agency

38. RENEGOTIATION BOARD:
    Total agency

39. SECURITIES AND EXCHANGE COMMISSION:
    Total agency

40. SELECTIVE SERVICE SYSTEM:
    All operating units of system

41. SMALL BUSINESS ADMINISTRATION:
    Total agency

42. SMITHSONIAN INSTITUTION:
    Buildings Management Department

43. TARIFF COMMISSION:
    Investigative functions

44. TENNESSEE VALLEY AUTHORITY:
    Automatic data processing operations
    Printing plant
    Overall agency

45. U.S. INFORMATION AGENCY:
    Administration
    Broadcasting Service, technical operations
    Press and publication service

46. VETERANS ADMINISTRATION:
    Board of Veterans Appeals
    Department of Medicine and Surgery
    Department of Veterans Benefits

APPENDIX II

EXCERPTS FROM THE CONGRESSIONAL RECORD

May 13, 1974

Senator Proxmire's Statement

"WHAT IS RIGHT WITH THE FEDERAL GOVERNMENT:
INCREASES IN GOVERNMENT PRODUCTIVITY"

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WHAT IS RIGHT WITH THE FEDERAL GOVERNMENT: INCREASES IN GOVERNMENT PRODUCTIVITY

Mr. PROXMIRE. Mr. President, Americans rightly find a great deal wrong with their Government. They have difficulties with the bureaucracy, problems with their veterans' pensions, issues over their income tax, and hassles with this agency or that agency over grants or policies.

But even though there are thousands of examples where Government is insensitive to citizens' problems and slow to move, it is nonetheless true that there has been an amazing increase in Government efficiency over the years.

BREAKTHROUGH ON PRODUCTIVITY

In fact, the Federal Government may be on the brink of the greatest improvement in Federal Government efficiency in our history.

This improvement could mean that a streamlined, cost-conscious Federal Government could provide more services with an easier tax burden.

This sharply contradicts the prevailing wisdom that Government is not only more corrupt but more wasteful, that it is doing almost everything wrong, and that the one certainty about our future is that Federal taxes will grow ever more burdensome. Of course, that latter sad situation may develop, but if so, it will be because of human failure to take advantage of a rich opportunity to cut Government costs and the tax burden.

Recent developments for the first time make it possible literally to get more out of our Government—in a big way—for our tax dollar. Here is how:

First. For the first time in our history the Government is measuring its productivity. It is at long last asking the right questions: How much production are we getting from each Government agency for each man-hour we pay for? How has this production been changing in each agency? Has it been improving or getting worse? How much has it been improving? How can it improve more? Asking these questions is as vital to getting more for our tax money out of Government as the same questions have been for years for our immensely productive private economy.

Second. The Federal Government is about to adopt a budget reform act that has passed both Houses and which will require the Congress to set a ceiling and make the tough spending priority choices within that ceiling that will force the rejection of the less necessary and more wasteful Government activities.

Third. The productivity drive and the budget reform act may be about to force the Government to make a big new investment in labor saving equipment that could result in a sharp reduction in costs in the next few years.

Fourth. For the first time in its history the Government has just begun to measure its productivity and has found that contrary to the assumptions of most economists it has improved year by year. In some agencies the improvement in productivity has been better than twice as great as it has been historically in the private sector. In most it has lagged behind the private sector. And in some—about 30 percent of Government jobs—it has actually declined.

But more than 60 percent of Federal Government jobs are now made subject to Government productivity measurement, compared to only 12 percent in the private sector, and there is no question—hard as it may be to believe—that the taxpayer is not only getting more for his money than ever before, but he can get far more in the future.

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INCREASED EFFICIENCY AT THE SOCIAL SECURITY ADMINISTRATION

Now let me be specific about my claim that the Federal Government may be on the brink of the greatest improvement in efficiency in our history through increases in productivity.

In fiscal year 1973 the Social Security Administration serviced about 30 million retirement, survivors, and disability insurance beneficiaries. In addition, they serviced about 20 million persons under health insurance programs, or a total of 50 million people.

They had 3.9 million claims for retirement and survivors' benefits. They had claims from 1.5 million people for disability insurance. They had 79 million claims for payment for medical services. They issued 11 million new social security account numbers. They posted 348 million items to update the earnings records of individuals covered by social security. That was their workload.

But those questions have never been asked before and that is one of the reasons why the Federal Government has become so oppressive in many cases and less efficient than it should be.

What kind of job are they doing? Compared with the job they did in 1964, they have vastly improved their efficiency. In that period their workload went up by 1¾ times or it was 274 percent of the 1964 workload. But in that period, they performed this additional workload with only 77 percent more people or 177 percent of the 1964 workload.

If you divide this work output by the manpower used, you find that the Social Security Administration was about 54 percent more efficient in 1973 as in 1964. And the estimate for 1974 is that it will rise to 62.25 percent.

That is what is called productivity. Throughout the Government there have been marked improvements in recent years.

I ask unanimous consent that a table entitled "Indexes of Work Output, Manpower, and Productivity" for the Social Security Administration for the period to 1974 be printed in the RECORD.

There being no objection, the table was ordered to be printed in the RECORD, as follows:

INDICES OF WORK OUTPUT, MANPOWER, AND PRODUCTIVITY

Year	Work output	Manpower	Productivity[1]
1964 actual	100.00	100.00	100.00
1965 actual	104.69	99.70	105.01
1966 actual	151.56	136.74	110.84
1967 actual	175.10	140.06	125.02
1968 actual	198.50	154.51	128.47
1969 actual	206.75	153.48	134.71
1970 actual	218.31	151.34	144.35
1971 actual	231.02	156.39	147.72
1972 actual	238.99	159.23	150.09
1973 estimate	273.55	177.90	153.77
1974 estimate	348.37	214.71	162.25

[1] Productivity index equals work output index divided by manpower index times 100.

PRODUCTIVITY REPORT—60 PERCENT OF MANPOWER COVERED

Mr. PROXMIRE. Mr. President, on June 30, 1973, a task force composed of the Executive Director of the Civil Service Commission, Mr. Bernard Rosen, the Assistant Comptroller General, Mr. Thomas Morris, and the then Assistant Director of the Office of Management and Budget, Mr. Dwight Ink, reported their findings on productivity in the Federal Government. This summary report was entitled "Measuring and Enhancing Productivity in the Federal Government—Phase III."

Their report covered 45 agencies of the Government, some 187 organizational elements in these agencies, and involved 60 percent of the manpower in the Government for the period fiscal years 1967–72. Here is what they found:

First, the productivity of these 45 agencies which included 60 percent of the manpower of the Government, increased by 8.7 percent in the period, or by 1.74 percent per year. The increase varied from 1.1 percent in 1969 to 2.8 percent in 1970. Over the period there was a 12.8-percent increase in output with a 3.8-percent increase in man-years which gives a total increase of 8.7 percent.

I ask unanimous consent that a table showing the total productivity increase for these years be printed below.

There being no objection, the table was ordered to be printed in the RECORD, as follows:

Item	Total for fiscal years 1967–72					
	1967	1968	1969	1970	1971	1972
Outputs	100.0	105.1	107.9	110.9	112.3	112.8
Inputs (man-years)	100.0	103.8	105.5	105.4	105.0	103.8
Productivity (output per man-year)	100.0	101.2	102.3	105.2	107.0	108.7

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MARKED DIFFERENCES IN PERFORMANCE

Mr. PROXMIRE. Second, among the 187 organizations in these 45 agencies there were marked differences in productivity. Some 58 organizations had a decline in productivity while 129 elements or organizations saw an increase in productivity.

Of the 129 organizations which showed an increase, 96 or 75 percent of them had more than a 10-percent productivity increase. Even more startling, 70 of the 129, or 54 percent, showed more than a 20-percent productivity gain.

Of these 58 agencies showing a decline, the decline was limited to 10 percent or less in more than half, or 31 of the 58, and only 10 had a decline greater than 20 percent.

On the whole these results were good and showed that in the Government as well as in private industry, increases in efficiency and productivity can be made and have been made.

Further, they are conservative results for they do not include the improvements in quality or complexity of the services provided.

This is important for a great many people believe that principles of private business and management cannot be applied in the Government sector. This is just not true.

Thousands of Government personnel do routine work of processing. This is not only true of the Social Security Administration but it is equally true of the Internal Revenue Service, the Passport Office, the Veterans' Administration, the Post Office, the Customs Service, the Tariff Commission, the Railroad Retirement Board, and dozens of other agencies

BREAKTHROUGH FOR GOVERNMENT

Why is this study and its results important? The only way the Federal Government can provide the big increase in the services demanded by the American people without bankrupting the Government and placing an impossible burden on the taxpayer is through increases in efficiency. Otherwise, it will be taxpayer ripoff.

We are now on our way. We have taken the first steps in providing the basis for a vast increase in productivity. We are measuring productivity in the Federal Government. We know that there have been overall increases. We also know that these increases have been less than in the private sector but significant increases nonetheless.

We therefore have a basis for improvement. We know how to do it. We know that it can be done. We are on our way and we have the momentum. This is the way we can give the taxpayer more services for his tax dollar. That is why the study and its results are so important.

It is a major breakthrough for the Government for until recently no one believed that the successful, private industry, programs for efficiency could be applied to the Federal Government.

SPECTACULAR EXAMPLE OF CUSTOMS BUREAU

While the average increase in productivity is somewhat low, there are some spectacular examples of agencies where the increase was high. Let me give just one rather spectacular example from the report. It deals with the Bureau of Customs of the Treasury Department.

From 1967 to 1972 there was a 93-percent increase in the number of parcels or mail coming from abroad. The number rose from 1.5 million to almost 3 million parcels.

In the same period, the number of man-year used rose from 511 to 735, or by 44 percent, to process this vast increase in volume.

But the number of parcels handled per man-year increased from 30,400 to 40,500, or by 34 percent, or an increase in the productivity index from 100 to 134.

How did this happen? How could one man process one-third more than he did before?

First, specialized facilities were developed to process airmail, on the one hand, and surface mail, on the other.

Second, duplicate handling was eliminated. At San Francisco, for example, formerly a second processing took place in the land customs offices even after processing at San Francisco.

Third, mail handlers were specially trained and given new promotion opportunities.

And finally, this happened even though the work became more complex and there was an increasing improvement in quality because of the demand to look more closely for illegal drugs, weapons, and explosives.

This annual average productivity increase of 6.8 percent for these 5 years is a very major accomplishment—twice as great an increase, incidentally, as we have had in the private sector of the economy on the average.

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MANPOWER SAVINGS FROM INCREASED PRODUCTIVITY

Because of the overall gain in productivity in these 45 agencies and 60 percent of the Government manpower which was covered by the study in the fiscal years 1968–72, there were some very big savings in wages. Fewer man years were required to process the same amount of work at the end of the period than at the beginning. The cumulative savings in wage costs for the period was estimated at $1.5 billion. This is not a net savings for it does not include the cost of new equipment, training costs and the change in organization. But the savings for salaries alone was $1.5 billion even though both the quantity of work and the quality of the work, in the view of those who were in the project, were vastly increased.

WHERE THE GAINS WERE MADE

In some areas some very spectacular increases in productivity were made. I am now speaking of functions rather than of agencies as such.

Probably the largest overall gain by function was in processing loans and grants where the measured increase was 47.7 percent in the period. Specialized printing was another area with a large increase, namely almost 25 percent. The overhaul and maintenance of heavy equipment showed a 35-percent gain.

On the other hand, standard printing in the Government showed a decline of 15.4 percent and the public service in hospitals and clinics showed an 8-percent decline in the period.

WHY HAS PRINTING SUCH A BAD RECORD?

The raw unpublished data for increases in productivity in the printing industry as a whole indicates an annual rate of change from 1959 through 1971 of about 2.3 percent per year. Yet standard printing in the Government saw a decline of about 3 percent per year while specialized printing in the Government saw an annual productivity increase of about 5 percent per year.

The study indicates that productivity in standard Government printing may have been low because the high productivity areas were contracted out privately while the Government was left with the cats and dogs which lowered productivity.

My own view is that that is probably an excuse and that the lack of mechanization, organization, and training accounts for it. I see no reason why Government printing should not improve at least the private rate of 2.3 percent per year.

REASONS FOR GAINS

The big gains in productivity in certain areas came about for several reasons. Foremost among these was the far greater use of computers and machines.

Not including the military and intelligence activities, where the largest number of computers are to be found, there was an increase from 2,412 computers in 1968 to about 6,000 at the end of the study.

Further, simplifying procedures and applying statistical sampling was a major reason for the increase in productivity.

In addition, improvements in organization added greatly. For example, the reorganization of the Export-Import Bank to process loans by type of loan rather than by geographic region allowed for a much greater specialization among those doing the processing and added to efficiency.

Finally, improvements in the education and training of personnel brought increases in efficiency.

JOLIET EXAMPLE

One sensational example of how adaptation by the Government of private enterprise investment opportunities saved millions was at the Army ammunition depot at Joliet, Ill.

The Army selected 24 capital investments improvements and allocated $500,000 to them. They returned more than $1.8 million in the first year, or $18 million on a ten year basis for a half million investment. In other words, $500,000 was invested, and the Government got $18 million out of it because of the great productivity in the labor-saving equipment introduced.

This 300-percent return in the first year was brought about by investments like that in an automatic nailing machine which saved 20 men in constructing pallets, an automatic ammunition loader which saved 42 men, and an automatic scrap compactor which increased the recovery rate and reduced storage space and repayed the investment in 160 days.

It is these kinds of opportunities which private industry routinely seeks out which the Federal Government must now encourage.

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But the Federal Government will have a rough time doing it. In the spectacular gains in the Joliet example, machines replaced men. In private industry that happens routinely. But in government, bureaucrats are reluctant to part with their manpower. Jobs are based on how many people are supervised.

It is going to be a very very tough proposition indeed to get top bureaucrats to introduce labor saving devices which will reduce the number of people under their jurisdiction. Yet the Joliet examples shows that it can be done with spectacular results.

A further difficulty is that it takes big initial capital investment funds. Because of the backward way the budget is put together, the OMB is reluctant to provide funds for investment because the new machines have to be written off in 1 year rather than amortized over their life. This is going to be a big drag on Government productivity gains.

The conclusion of Elmer Staats and the other experts was that this is where the Government can increase its efficiency, its productivity, can cut costs, can ease the burden on the taxpayer, by making the kind of capital investment that we simply have not made in the past and that one would expect a bureaucracy to resist without this knowledge of how much it will save the taxpayer.

I ask unanimous consent that the transcript of the hearings on Federal productivity held by the Subcommittee on Priorities and Economy in Government of the Joint Economic Committee, held on December 17, 1973 (pp. 34–42) in which the Joliet Arsenal examples was discussed, be printed at this point in the RECORD.

There being no objection, the transcript was ordered to be printed in the RECORD, as follows:

TRANSCRIPT

Mr. STAATS. If I may, I would like to turn to page 17, the importance of capital investment in productivity improvement.

Authorities have concluded that improved technology and the availability of more capital per worker have been the major sources of productivity growth in the private sector over a long period of time. In light of this finding, the joint project team studies ways in which Federal agencies now select capital investment items for inclusion in their annual budgets. The team found that Federal managers sometimes lack the incentive and opportunity to seek funds for cost-reducing capital investments. Such projects tend to drop out of tight budgets when they have to compete with items related to program requirements or current priorities, such as pollution abatement, health and safety. This contrasts sharply with the experience in the private sector, where top management and boards of directors keep the spotlight on such investment.

To document opportunities for more timely financing of productivity—improving investments, the joint team obtained data on unfunded projects from 14 agencies and selected a number for analysis.

There is a special report on this, Mr. Chairman, which I believe you have before you. But in this sample the team identified 392 projects which would be self-liquidating in less than three years—with one time savings of $62 million and recurring annual savings of $66 million. The team believed that this sample covered only about half of the opportunities which might have been discovered in a complete inventory. Examples of the investment possibilities are modern materials-handling equipment, tape-driven machine tools, automated laboratory equipment, mechanized warehouse equipment, consolidation of facilities, and others.

Concurrent with the team's study, the Army conducted its own test by allocating a $500,000 fund, available only for fast payback capital investments, to its Ammunition Procurement and Supply Agency (APSA) in Joliet, Illinois. APSA was allowed to make immediate decisions on proposed investments by the Government Owned Contractor Operated (GOCO) ammunition-loading plants where the payback could be achieved in two years or less. In a few months, 24 projects were approved which would return $1.8 million in annual savings. The majority of these projects have paid or will pay for themselves in less than 180 days following installation. Illustrations are:

An automatic nailing machine costing $38,185 saved 20 men in constructing pallets for bombs. The annual savings of $240,000 resulted in an amortization period of 57 days. And there are other examples here. We have a chart which again Mr. Morris will explain to you, which I think illustrates very graphically what savings is possible.

Senator PROXMIRE. That first example you gave, an automatic nailing machine costing $38,000 and saving 20 men, that would pay for itself in less than a year, wouldn't it?

Mr. MORRIS. In less than three months.

This is the startling thing about what this study has revealed, that there are many, many investments at activity locations which are passed up—

Senator PROXMIRE. Have the newspapers picked up this at all? Has this story been released or handled in such a way that the newspapers have let the success story be known.

Mr. MORRIS. No sir.

Senator PROXMIRE. I am as energetic as anybody, or more so, for criticizing the Defense Department for wasting money and for all their failures. I think something like this—you ought to let this one read as something that is an example of the success of the military.

Mr. STAATS. That is a very good point you are making, Mr. Chairman, because we ought to be in a position to give more recognition to people who are willing to make these kinds of decisions.

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Mr. INK. Mr. Chairman, if I might just add a note, there have been several instances in which this type of thing has been released to the press. But frankly, we have had great difficulty in interesting the press in picking it up.

Senator PROXMIRE. Mr. Ink, could you give me, when you get a chance, maybe in the next couple of days write me a letter giving me the instances that you have in mind. Maybe if I put them all together I could get together with some press people and see if we can give that a ride. Because—

Mr. INK. I don't have a complete listing, but—

Senator PROXMIRE. Just give whatever number of examples you think would be most impressive. I think this one right here if presented in the right way—if you can pay for something in three months, that is fantastic. Anybody who didn't do that in private industry would be out on his tail if he had any kind of board of directors.

I am sorry to interrupt you, Mr. Morris.

Mr. MORRIS. That is all right, sir. You made the point so quickly that I didn't feel it necessary to proceed.

What we have learned is that our appropriations process and our budget planning process just simply isn't geared to permit this kind of expenditure to take place in a timely way. The process may run to 19 to 20 months for that $36,000 item. We not only lose the saving during that time, but when we have got to the point of finally buying it there is probably something else that we should do with those dollars. So we have discovered through this study that we need much better procedures for allowing people to proceed quickly to make investments that they are going to pay back in a few months' time. Out of 24 cases one paid back in 30 days, five in two months, four in 90 days, six in 180, and only eight went over six months. The Air Force and the Navy are doing similar things now, we are advised.

Mr. STAATS. Why don't you go ahead and present the other charts while you are there?

Senator PROXMIRE. Only eight went over six months, and in six months to two years they had all paid for themselves?

Mr. MORRIS. Yes sir. Altogether there were 24 cases. Those are just other illustrations. And we have all 24 which will be submitted for the record.

Mr. Banowitz of the Defense Department is with us, and he is responsible for this program. But as you see, we have cases where expenditures of $50,000 were paid back in 41 days. So it is just obvious that there are many opportunities that we have never known about, they have been buried.

Senator PROXMIRE. That automatic loading and small arms ammunition pays for itself in 41 days. It is astonishing.

Mr. MORRIS. That is right, sir, saving 42 people who were engaged in packing operations.

Senator PROXMIRE. That is $435,000 a year. That is not peanuts.

Mr. STAATS. We could cite many other examples, Mr. Chairman, but these are just a few that help bring out the basic point. We cite a couple of others here, and there are many more in the document which we have given to you. On page 19 we point out——

Senator PROXMIRE. Maybe Mr. Ink, if I just go through this a little more carefully than I have had a chance to I can get them out of here. This chart itself gives me great success stories.

Mr. STAATS. We are advised that the Air Force and the Navy are considering similar tests to the ones we have just referred to here. The experiences revealed here are of such value that we are submitting a more detailed writeup on it for inclusion in your hearing record. We think it is very important.

Mr. CHAIRMAN. I might digress here to say that one of the most encouraging things about this whole study that we have done is to get people to be thinking in terms of productivity analysis, capital investment decisions, personnel management, and so forth. So that this is one of the fallouts or by-products that we are getting, from the very fact that we are beginning to focus now on productivity and output measures.

After considering these findings, the joint team concluded that several actions were necessary to insure timely capital investments in support of future productivity improvements:

First, the need for clear visibility in the Federal budget process, through a separate declaration to OMB and the Congress, of capital items with productivity-enhancement potential.

Second, expert attention to developing high-payoff capital investment opportunities. This means adding to agency organizations personnel trained in identifying such opportunities.

Third, better audits of actual results obtained to insure credibility and achievement of the results anticipated.

Fourth, timely financing. A study of ways to achieve this objective is continuing. It may be that legislation may be necessary to allow certain activities, particularly those operating under industrial or revolving funds, the authority to borrow or otherwise establish reserves for new equipment purchases.

Senator PROXMIRE. Could I interrupt at this point and say that I think it would be very helpful—I don't know if you can do it, if you are in a position to do it—if we could work in the direction of trying to determine just some examples for each Subcommittee Chairman, the House and Senate Appropriations Committee. For example, I am Chairman of the Committee that handles the money for HUD, the Veterans, and for Space, and so on. If I could show some examples of some savings there in each of these agencies, any three or four of those agencies, I am sure that my opposite number in the House, Congressman Boland, would be just as interested as I am, or more so. And I think this is true right down the line of all the Subcommittee Chairmen of the House and Senate. And I would think that the agency heads would also be very interested in this kind of thing if it is called to their attention.

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Mr. STAATS. You have anticipated me a little bit here, because in our future plans here we say in here in the second paragraph that the Joint Financial Management Improvement Program task force, in which GAO will actively participate, has been assigned the responsibility of analyzing the factors which have caused productivity changes and preparing an annual report to the President and the Congress. The report will analyze productivity trends and present case studies to illustrate factors contributing to productivity increases and decreases. The task force will also continue to seek opportunities for expanding the coverage of the indices.

Now, here is something that is relevant to your qeustion, Mr. Chairman, in addition, GAO plans to report annually to the Congress on the agencies' progress in (1) identifying opportunities for using laborsaving equipment and (2) acquiring it. We believe such visibility is necessary to insure attention to such investments, without which the Government will fall short of achieving its full potential for improved productivity.

You have made a good suggestion, I think here, that we could bring this down by agencies and by Subcommittees of the Appropriations Committee.

Senator PROXMIRE. I think we would all be enormously grateful. We are all looking for these things, and we want to do something that will enable us to get things for the taxpayer dollars, and cutting out services that we can cut. We haven't looked at that other thing.

Mr. STAATS. We are very enthusiastic about this approach, and we think it should be extremely helpful to both the agencies and the Congress.

BUREAU OF LABOR STATISTICS

Mr. PROXMIRE. During a hearing on Friday, May 3, of the Subcommittee on Priorities and Economy in Government of the Joint Economic Committee on the subject of the monthly unemployment figures, the Commissioner of the BLS, Dr. Julius Shiskin, discussed productivity in his agency.

At his agency, productivity averaged 3.7 percent from 1967 to 1973, a very good figure and one which compares favorably with private industry. Because they are a statistical organization there are obviously great opportunities for introducing computers and laborsaving devices. Nevertheless they have made a good record.

But listen to what Dr. Shiskin said about productivity at the BLS when he came there a few months ago. I quote from the hearing:

One of the things I found when I came to BLS—and here we have an establishment of about 2,000 workers—is that there are a lot of people that didn't know what they were supposed to be doing.

He went on:

And apparently there were many people in fairly high positions who didn't understand what their role was in the organization.

He has taken steps, particularly through a rank and file committee on underutilization to act on this problem.

But the point is that there are in every agency of Government, great opportunities to make improvements. If the BLS, which has had one of the best productivity records, had a lot of people who "didn't know what they were supposed to do" and "many people in fairly high positions who did not understand that their role was in the organization," then there must be and are tremendous opportunities for improvement.

I ask unanimous consent that the letter and enclosures which Dr. Shiskin sent me subsequent to his appearance be printed in the RECORD at this point.

There being no objection, the material was ordered to be printed in the RECORD, as follows:

BUREAU OF LABOR STATISTICS,
Washington, D.C., May 9, 1974.

Hon. WILLIAM PROXMIRE,
U.S. Senate,
Washington, D.C.

DEAR SENATOR PROXMIRE: During my appearance before your subcommittee on May 3, you requested that I furnish you with some information on producivity in the BLS and management improvements that have been recently initiated in the Bureau of Labor Statistics over the past several months. I enclose two reports in response to your request: (1) Productivity in the Bureau of Labor Statistics and (2) Recent Management Improvements in BLS.

I would like to note that in my daily contacts with members of the BLS staff at all levels, I am continually impressed with their Competence and commitment to the goals and objectives of the Bureau's program. The managerial efforts mentioned in the attachment, therefore, have been taken in recognition of the tremendous importance of the Bureau's programs in the provision of meaningful economic and statistical data to the Nation's decision-makers and the general public and the constant need for improving the organizational and managerial effectiveness and efficiency of our organization.

If you wish to have any further information, please call.

Sincerely yours,

JULIUS SHISKIN,
Commissioner.

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BUREAU OF LABOR STATISTICS,
Washington, D.C.

PRODUCTIVITY IN THE BUREAU OF LABOR STATISTICS

Table 1 presents the overall productivity, output, and man-year indexes for the Bureau of Labor Statistics for FY 1967–73. For comparison with the BLS productivity trends, table 2 presents the productivity indexes for the overall measured sample of the Federal Government (covering 61 percent of Federal civilian man-years in FY 1973) and for "Reference Services" (the functional category in which BLS is classified). Although it would have been desirable to make comparisons with only statistical organizations, the data were too limited.

BLS PRODUCTIVITY TRENDS AND CASUAL FACTORS

BLS productivity showed a strong upward trend of 3.7 percent per year from FY 1967 through 1973 which reflected a sharp increase in output coupled with a modest rise in man-years. Year to year productivity changes were substantial ranging from –3.4 percent in FY 1970 to 9.7 percent in FY 1972.

Over the whole period, the BLS performance was substantially higher than that of the overall sample for the Federal sector as well as for the function grouping of agencies which were performing somewhat similar functions.

The gain in BLS output per man-year during the seven-year period can be attributed primarily to: (1) increased use of automatic data processing which shortened the production time of established outputs and enabled a broadening of scope in many programs, (2) the gradual upgrading of clerical staff to professional status, (3) increased use of computer terminals within program offices, and (4) extending and modifying a reorganization of the Bureau along functional lines which increased specialization of manpower in some critical positions.

TABLE 1.—PRODUCTIVITY, OUTPUT, AND MAN-YEAR INDEXES FOR THE BUREAU OF LABOR STATISTICS, FISCAL YEARS 1967–73

[Fiscal year 1967=100]

	Productivity	Output	Man-years
Indexes:			
1967	100.0	100.0	100.0
1968	105.1	105.2	100.1
1969	114.6	111.7	97.5
1970	110.7	105.6	95.4
1971	113.4	121.4	107.0
1972	124.4	139.0	111.7
1973	126.4	144.2	114.1
Year to year percent change:			
1967–68	5.1	5.2	.1
1968–69	9.0	6.2	–2.6
1969–70	–3.4	–5.5	–2.2
1970–71	2.4	15.0	12.2
1971–72	9.7	14.5	4.4
1972–73	1.6	3.7	2.1
Average annual rate of change: 1967–73	3.7	6.4	2.6

TABLE 2.—PRODUCTIVITY INDEXES FOR THE BUREAU OF LABOR STATISTICS, TOTAL GOVERNMENT SAMPLE, AND REFERENCE SERVICES, FISCAL YEARS 1967–73

	Bureau of Labor Statistics	Total Government sample	Reference services [1]
Productivity indexes, 1967=100:			
1967	100.0	100.0	100.0
1968	105.1	100.7	102.1
1969	114.6	102.8	110.7
1970	110.7	104.0	111.2
1971	113.4	105.7	111.3
1972	124.4	106.4	114.2
1973	126.4	111.3	109.2
Year-to-year rates of change:			
1967–68	5.1	.7	2.1
1968–69	9.0	2.1	8.4
1969–70	–3.4	1.2	.5
1970–71	2.4	1.6	.1
1971–72	9.7	.7	2.6
1972–73	1.6	4.6	–4.4
Average annual rate of change: 1967–73	3.7	1.7	1.8

[1] Reference services includes the following elements: National Agricultural Library (Agriculture), Statistical Reporting Service (Agriculture), National Technical Information Service (Commerce), National Archives (GSA), NIH Library of Medicine (HEW), Bureau of Labor Statistics (Labor), Broadcasting Services Technical Operations (USIA), Civil Rights Commission, Public Documents (GPO).

RECENT EFFORTS TO IMPROVE MANAGEMENT IN BLS

CLARIFICATION OF FUNCTIONS AND RESPONSIBILITIES OF EACH MAJOR OFFICE IN BLS

In 1967, the Bureau of Labor Statistics experienced a major reorganization that created a functional organization structure comprised of substantive program offices, such as Wages and Industrial Relations, Prices and Living Conditions, Manpower and Employment, etc.; a central data collection and processing organization in Washington that planned and controlled the survey design, sample selection, data collection and processing of statistical data for each survey; a central Publications Office; a central Administrative Management Office; and, finally, a number of regional offices where survey collection, regional economic analysis and information and correspondence functions were performed. Prior to that date, each substantive program office within the Bureau had complete control over its program from the development of program specifications, through the design and collection of the data, to the analysis and publication of the results. Over the years, several minor modifications to the basic organizational structure were made. Each of these was an attempt to improve upon the basic functional organization created in 1967.

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Despite these efforts, some confusion over the respective roles and responsibilities of program offices and the support offices still existed within the Bureau when I arrived in August 1973. In an attempt to clarify the respective roles and responsibilities of each major component of the Bureau, a policy statement was prepared and released in November 1973 that clarified, in greater detail than had been done before, the functions and responsibilities of each major office in the Bureau. While no such statement can address every issue that may arise, it has resulted in more harmony and better communication between organizational units within the Bureau.

The Bureau's top management during its day-to-day involvement with the Bureau's organizational units is reinforcing, by its actions, the policy statement that has been developed. It is also clarifying further any areas of responsibility and authority that still seem to need it.

ESTABLISHMENT OF A COMMITTEE ON UNDERUTILIZATION

In response to the fact that in large organizations like the Bureau some employees are sometimes underutilized or in the wrong jobs, a Committee on Underutilization was established about six months ago. The basic function of the Committee is to determine the extent underutilization does, in fact, exist in the Bureau and to make specific recommendations which will help alleviate the problems in areas where fact-finding indicates they exist.

The Committee is comprised of a crosssection of BLS employees at all levels, except top management. It includes representatives of middle management, senior and junior professionals, and the statistical/clerical areas. Its modus operandi is: (1) to hold discussions with individuals who feel that they are being under-utilized; (2) to follow up or validate the information expressed by these individuals through interviews of a probability sample of BLS employees; and (3) to make specific recommendations on Bureau operations or policies that will alleviate any problems that are found to exist.

In areas where the Committee determines underutilization problems exist, but a more in-depth study needs to be conducted, the professional staff in the Office of Administrative Management will be utilized. Since underutilization and overutilization often is hand-in-hand, attention will also be focused on areas of overutilization and recommendations will be made to alleviate situations where constant heavy workloads on both supervisory and nonsupervisory personnel exist.

The Committee has already submitted several suggestions which have been accepted and others are being considered which, hopefully, will provide greater opportunities for motivating and utilizing the skills and talents of Bureau employees. This Committee provides an additional antenna, over and above the line managers and Personnel Office, in identifying areas of underutilization

DEVELOPMENT OF A PROJECT MANAGEMENT SYSTEM

BLS has developed and is in the process of implementing a project management system within the Bureau to better plan and control the execution of the Bureau's programs. This system is being applied on a test basis on the Bureau's FY 1974 new programs and several other important base programs such as the CPI Revision and the Computer Systems Redesign. Funds were allocated to each of the new programs based upon detailed plans that were developed by the responsible program office manager in consultation with representatives from the affected support offices within the Bureau.

Each project has detailed milestones developed that indicate the steps or events that are needed to be completed and the individual and organization responsible for each step. Detailed cost and manpower estimates have also been developed for each project.

Monthly reviews of the program's progress will be held in the future on each project to make sure the project is on schedule and within resource allocations. Bureau Management will be furnished with detailed obligation and cost reports to and in the tracking of the resources.

ESTABLISHMENT OF A CPI REVISION MANAGER

In an effort to provide the Bureau with the required managerial focus for completing the remaining portions of the CPI Revision program and to assure meeting program objectives within the existing dollar ceiling, a CPI Revision Manager position was established within the Bureau, reporting directly to the Commissioner and having responsibility for the planning and management of the program.

The Manager supervises a small staff assigned to his immediate office to assist him. He manages the planning and execution of the CPI Revision Program through the assignment of responsibility and authority to the various organizational units within the Bureau and contractors as necessary. He has management responsibility and authority for all CPI Revision resources and resource allocation. The Manager utilizes a management team made up of representatives from each of the interested organizations to coordinate the various activities of the program.

ESTABLISHMENT OF A TASK FORCE ON DECENTRALIZATION

In keeping with the Administration's basic policy to decentralize as much as possible of the Government operation to the regions and in order to improve the overall effectiveness and efficiency of the Bureau, I recently established a small task force to study the BLS program, its organizational structure, and operating procedures to determine whether there are certain activities that are now performed in Washington that could more effectively be conducted at the regional level. As mentioned earlier, the reorganization of 1967 did decentralize considerable authority to the BLS regional level. The function of this task force will be to review the Bureau's operation as it currently exists and to see whether some additional decentralization could and should take place.

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ESTABLISHMENT OF A MONTHLY PROGRESS REPORT

In August 1973, a reporting requirement was established for a Monthly BLS Progress Report. The primary objective was initially to help the new Commissioner become more familiar with the total activities of the Bureau. The report covers major accomplishments for each organization within the Bureau for the previous months; major, current and planned activities; and major unresolved issues and problems. The reports are also utilized by Bureau management to communicate to its employees on the plans, status, and problems of the Bureau's many programs. The reports are distributed to members of the Executive Committee and Assistant Regional Directors for Bureau of Labor Statistics. These managers, in turn, are encouraged to circulate the reports to members of their staff and to make the reports available to any employee who may wish to read them. An all-employee memorandum has been distributed announcing the availability of the reports and encouraging their use.

REVIEW OF BUREAU PROGRAMS CONTENT AND ITS RELEVANCE

The managerial improvements discussed above would all be for naught if the Bureau programs, that is, the economic and social statistics which are produced by the Bureau, were not the appropriate ones to meet public needs. The Bureau's program is subject to continuous review by our Business Research Advisory Council and our Labor Research Advisory Council. In addition, the Subcommittee of the Government's Council on Economic Policy, various OMB Interagency Committees, and the Subcommittee on Priorities and Economy in Government of the Joint Economic Committee of Congress review our program and provide us with their advice and comments. Nevertheless, to insure that our programs and their resultant data are relevant, important, timely, and accurate, a comprehensive review of the Bureau's programs has been initiated. The results of this review, when completed, will be reflected in future program proposals and budget documents.

CONCLUSION

Mr. PROXMIRE. Measuring and improving the Federal Government's efficiency and productivity is a new endeavor. But the work done by the GAO, the OMB, and the Civil Service Commission in measuring what has gone on in some 45 agencies covering 60 percent of the man-years in the Government is very encouraging. Until 10 years ago we had never even measured productivity in the Federal Government.

In some areas like social security, the Customs Service, and specialized printing, spectacular gains have been made.

Overall, far more gains than losses have occurred. Further, the conclusion that more than half of the 187 organizations covered by the study had a productivity gain of 10 percent or more, and 70 or 37 percent had productivity gains of 20 percent or more, means that government procedures can be improved and are being improved even with a much greater workload.

The fact is that the American public's social security check, income tax form, and parcels coming in from abroad are now processed at a much faster rate with relatively fewer people and with lower manpower costs than they were 8 or 10 years ago.

Government has many faults, but the study of productivity in the Federal Government shows that many, many improvements have been made, far more agencies have improved their efficiency than have seen it reduced, and the American people are being served by their Government in a far more efficient and productive way than before.

Much of our faith in our free economic system is based on the belief that the private sector operates more efficiently than the public sector.

The tough impact of competition and the iron power of the market place to compel and enforce efficiency and low cost as the price of staying in business explains a big part of this country's progress.

But the efficiencies of the free market can rub off on the public sector and do.

They have not rubbed off enough. There is much we can do. Now we can address ourselves specifically to productivity in the Federal Government.

Until Kermit Gordon's study and the study I have talked about today were done the assumption had been that there was no increase in the Federal sector in productivity. In gaging the economic growth of the country economists simply assumed zero growth for the Federal Government.

In the past few years we have started to measure Government productivity—beginning with Kermit Gordon's study of five agencies in 1962. We now have a measure of the productivity of 60 percent of all Federal jobs measured in man-years. That is five times the measurement of productivity we have of jobs in the private sector. And the data is available to increase that percent immediately to 65 percent.

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That measure is impressive for three reasons:

First. For the first time we are actually measuring Federal Government productivity.

Second. There is demonstrated, documented improvement in productivity in the Federal sector. That is contrary to the general belief among businessmen, bankers, and the general public.

Third. The improvement is substantial but it is still far less than in the private sector.

Because annual productivity improvement is less than in the private sector, we now have the basis for:

First. Recognizing where the shortfalls are so that we can concentrate on these sectors and improve them.

Second. Adapting the techniques that have been so promising in the private sector to the public sector to achieve a sharp improvement in the public sector. We can also adapt in those agencies that have not improved some of the techniques used successfully in the agencies that have seen big productivity improvements.

In recent years socialist economies have adapted in their governments those investment and automation techniques from the capitalist and free economic societies which have greatly increased the productivity of the free societies.

If socialist countries can adapt capitalistic methods of increasing production then the free economic societies should be even more able to adapt their own free economic techniques for use in improving their own governments' efficiencies.

Given the greater dependence of the American public on the services which their Government performs the fact that we are on our way is a very encouraging circumstance indeed.

It is one of the things which is right with America and right with the Federal Government.

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APPENDIX III

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

July 9, 1973

MEMORANDUM FOR THE HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Joint Project for Measuring and Enhancing Federal Productivity

I have been briefed on the final report of this joint effort of the Office of Management and Budget, the Civil Service Commission, and the General Accounting Office. As a result, I would like to perpetuate the lessons we have learned from this review and to encourage agency managers to make appropriate use of this tool for assessing past trends and planning future improvements in organizational productivity.

Under the general policy guidance of the Office of Management and Budget, General Services Administration will provide guidance and technical assistance to agencies in developing and using work measurement and productivity measurement systems. General Services Administration will also assist agencies in developing productivity improvement programs with respect to procedures improvement and mechanization projects.

The Civil Service Commission will provide leadership, policy guidance, and technical assistance to agencies about the personnel management aspect of productivity. This includes manpower planning and utilization, training, executive development, labor relations, pay and incentives, job design, personnel management research, and the integration of these functions with overall productivity improvement programs.

I am authorizing continuance of the annual productivity review and report along the lines which have been developed by the joint project during the past two years. For this purpose, General Services Administration will issue the annual data call, and the Bureau of Labor Statistics will collect the data and construct the indices using their regular techniques. The Joint Financial Management Improvement Program (JFMIP) task force will then analyze the factors which have caused productivity changes, and prepare a report for transmittal to the President and the Congress. This task force will also continue to seek opportunities to expand the coverage of the indices beyond the present 60 percent level, and to improve the representativeness of the measures.

Roy L. Ash
Director

APPENDIX IV

PRODUCTIVITY PROGRAM PARTICIPANTS

This report was prepared by the Joint Financial Management Improvement Program under the general direction of Donald C. Kull. The major staff work on the report was performed by John Moundalexis, Brian Usilaner and Edwin Soniat of the JFMIP staff. Valuable ideas and assistance in preparation and review of drafts were obtained from many people, particularly, Thomas D. Morris, GAO: Elsa Porter, CSC; Lee Tusing, DOD; Jerome Mark and Jeff Hohenstein; BLS: and Gordon Yamada, John Lordan, Jerry Tache and William Beasley of GSA.

The productivity data included in the report was furnished by the various operating agencies. Each agency has designated a productivity principal to coordinate agency efforts. A list of agency principals follows:

AGENCY PRODUCTIVITY PRINCIPALS

Jerome Miles	Agriculture
Harry Peebles	Atomic Energy Commission
Thomas M. Constant	Canal Zone Government
Raymond Kurlander	Civil Aeronautics Board
William Speck	Civil Service Commission
Stephen Browning	Commerce
Bert Silver	Commission on Civil Rights
Lee Tusing	Defense
Jim Yoniatis	Army
Captain D. J. Chamberland	Air Force
Richard Jackson	Navy
Gerald Flessate	Defense Supply Agency
Thomas Wolf	Economic Opportunity
Seymour Greenstone	Environmental Protection Agency
Paul C. Redmer	Farm Credit Administration
Richard Solan	Federal Communications Commission
Frank Crowne	Federal Home Loan Bank Board
Earl Updegrove	Federal Maritime Commission
Stephen P. Lejko	Federal Mediation and Conciliation Service
Marsh Moy	Federal Power Commission
Ralph West	General Accounting Office
Eugene Pierson	General Services Administration

Bryan Mercer	Government Printing Office
Dave Theall	Health, Education and Welfare
Robert E. Baden	Housing and Urban Development
David Seyler	Interior
Edward Borcik	Interstate Commerce Commission
Dick Condon	Justice
Phillip Oliver	Labor
Richard Mulligan	National Aeronautics and Space Administration
Ray Motsenbocker	National Credit Union Administration
Paul Berman	National Foundation on the Arts and the Humanities
Morris Miller	National Labor Relations Board
Calvin Jones	National Science Foundation
Wilbert Zimmerman	National Transportation Safety Board
R. C. Stringer	Postal Service
John Suker	Railroad Retirement Board
George Lenches	Renegotiation Board
Barbara McTigue	Securities and Exchange Commission
Alan Davies	Selective Service System
Schermen Price	Small Business Administration
Ann S. Campbell	Smithsonian Institution
Sy Levenson	State
Edward C. Wallington	Tariff Commission
David Patterson	Tennessee Valley Authority
J. Elton Greenlee	Treasury
Walter Jones	U.S. Information Agency
Lyle Warren	Veterans Administration
Emerson Markham	ACTION
Erwin J. Lachman	Agency for International Development
Col. W. P. Jones, Jr.	American Battle Monuments
Sidney Anderson	Arms Control and Disarmament
Yvette Butler	Equal Employment Opportunity Commission
Mary A. Pricci	National Mediation Board
J. Patrick Dogan	Export Import Bank

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